ACQUISITION PROCESS IN THE DEPARTMENT OF DEFENSE

HEARINGS

BEFORE THE

COMMITTEE ON
GOVERNMENTAL AFFAIRS
UNITED STATES SENATE
NINETY-SEVENTH CONGRESS
FIRST SESSION

OCTOBER 21, 27, AND NOVEMBER 5, 1981

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ACQUISITION PROCESS IN THE DEPARTMENT OF DEFENSE

WEDNESDAY, OCTOBER 21, 1981

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, D.C.

The committee met at 9:05 a.m., in room 3302, Dirksen Senate Office Building, Hon. William V. Roth, Jr. (chairman of the committee), presiding.

Present: Senators Roth, Cohen, Mattingly, Rudman, Pryor, and Levin.

OPENING STATEMENT OF SENATOR ROTH

Chairman ROTH. The committee will be in order.

Today the Committee on Governmental Affairs begins a series of hearings to examine the acquisition process in the Department of Defense. The acquisition of goods and services is, of course, one of its principal activities as well as one of its most complicated and expensive. In fiscal year 1980 alone more than 11 million separate contracts or procurement actions were completed in the Defense Department costing more than $83 billion.

To summarize what that means, an average of 900 contracts of all sizes, nearly 3 for every day of the year, were handled by each of the 13,000 contracting officers. Everything from lightbulbs to multimillion-dollar jet fighters were purchased by these contracts and the acquisition process through which these goods were guided by more than 300 different laws and regulations.

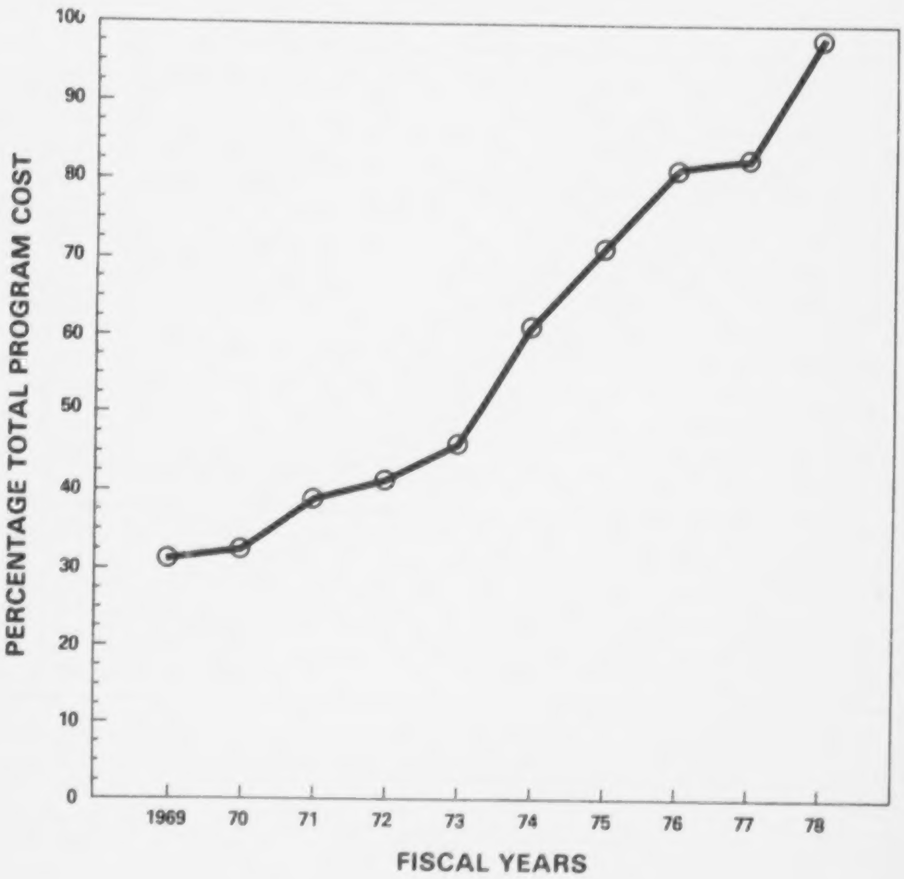
The complications and costs of DOD's procurement and acquisition process have been a matter of concern to the Congress and to the Nation's taxpayers for a number of years. Recent public opinion polls make it clear the public supports the strengthening of our defense, but it also realizes that the Department of Defense must take steps to tighten its management policies. Otherwise, the added dollars devoted to military expenditures may buy nothing more than fancy window dressing for the "window of vulnerability" which the President and our defense leaders have properly recognized.

There have been many attempts to reduce waste and excessive costs, especially with respect to the procurement of major weapons over the last two decades. Beginning in the early sixties, practically every Secretary of Defense has made good faith efforts to try to stop the leaks in the acquisition process from draining off valuable defense dollars. Yet it seems these efforts to reduce the costs of buying weapons and other goods in DOD is a lot like playing catch with a wet cake of soap, as soon as you think you have got it in your hands, it somehow slips away.

The war on waste and defense procurement practices has often only been a war of words. Many improvements have been proposed but few have been carried out, thanks in large to the inertia of our huge Defense Establishment.

Figures developed for my committee indicate that cost growth in major weapons systems in DOD has skyrocketed recently. Since 1969, the difference between the initial cost estimate and the current cost estimate in any given year for major weapons has gone from an average of 31 percent in 1969 to 190 percent as of June 1981.

DEPARTMENT OF DEFENSE SYSTEMS TREND ON COST OVERRUNS



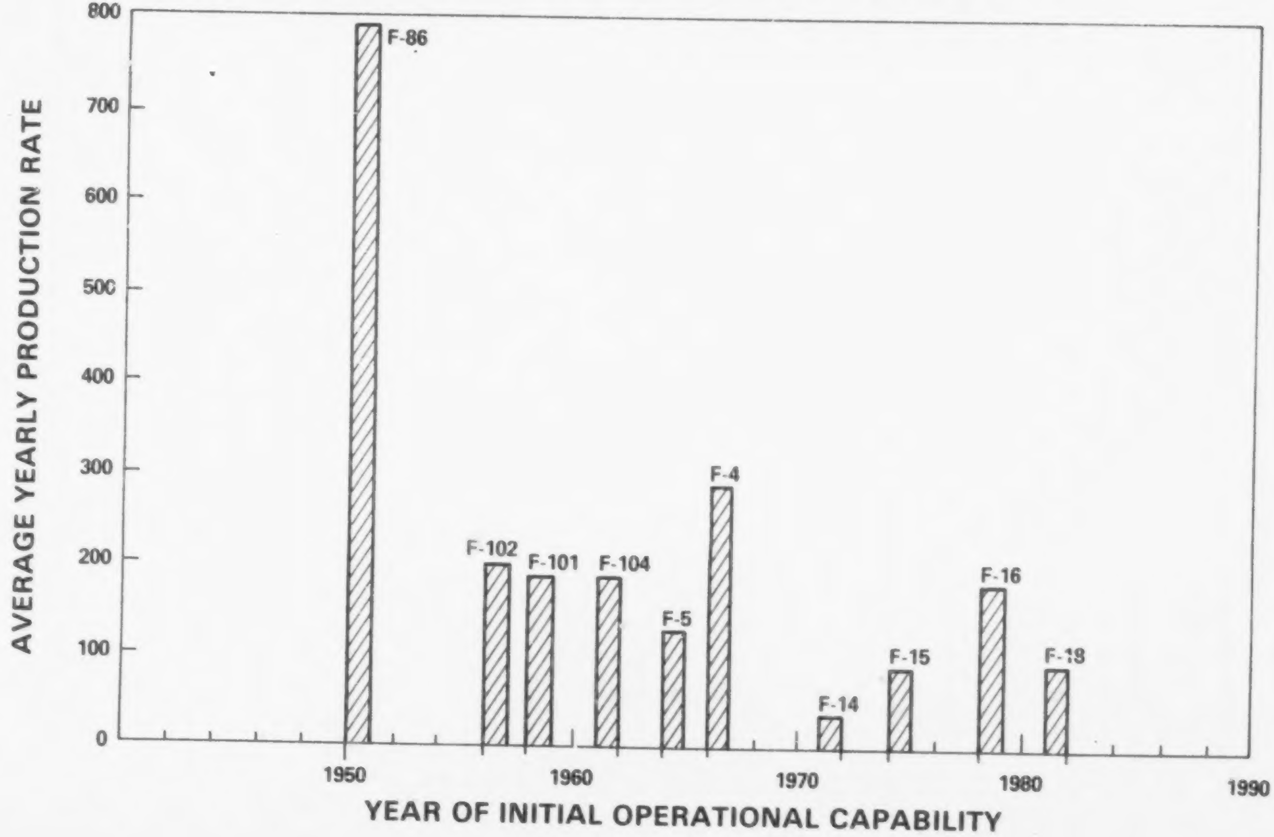
Chairman ROTH. And I understand the most recent reports show that that has jumped as high as 210 percent. In other words, the real cost of major weapons are now 190 or 210 percent greater on average than initial estimates indicated.

I also point out that cost growth is encouraged in the Government by a procurement system with seven to eight levels of management above each program. The process of acquiring a weapon in time has increased from an average of 5 years over the past two decades. These facts are symptoms of an acquisition process that is too complicated, too lengthy and, in the end, far too wasteful and expensive. Overbureaucracy and delay are not phenomena limited to civilian agencies. They can also be found wearing a blue or green uniform.

This year the President has made a number of important proposals designed to improve our ability to defend our Nation and the free world. Under the President's proposals, DOD outlays for fiscal year 1982 will rise by over 14 percent in real terms compared to 1981. The biggest gainer is the procurement account for which a real increase of 33.3 percent has been proposed in 1982. The proposed procurement increase would result in a 79-percent increase in Navy ships and an 86-percent hike in aircraft buys over the next 5 years.

Yet, I would point out that according to the chart here in the hearing room, to the left, despite the fact we are spending more money, as can be seen from that chart, we are getting considerably less aircraft.

TREND OF DECREASING YEARLY PRODUCTION RATE OF FIGHTER AIRCRAFT



Chairman ROTH. These increases and planned expansions in procurement will help improve our defense readiness only if we have in place a strong management structure to prevent waste and safe money while acquiring needed goods and weaponry.

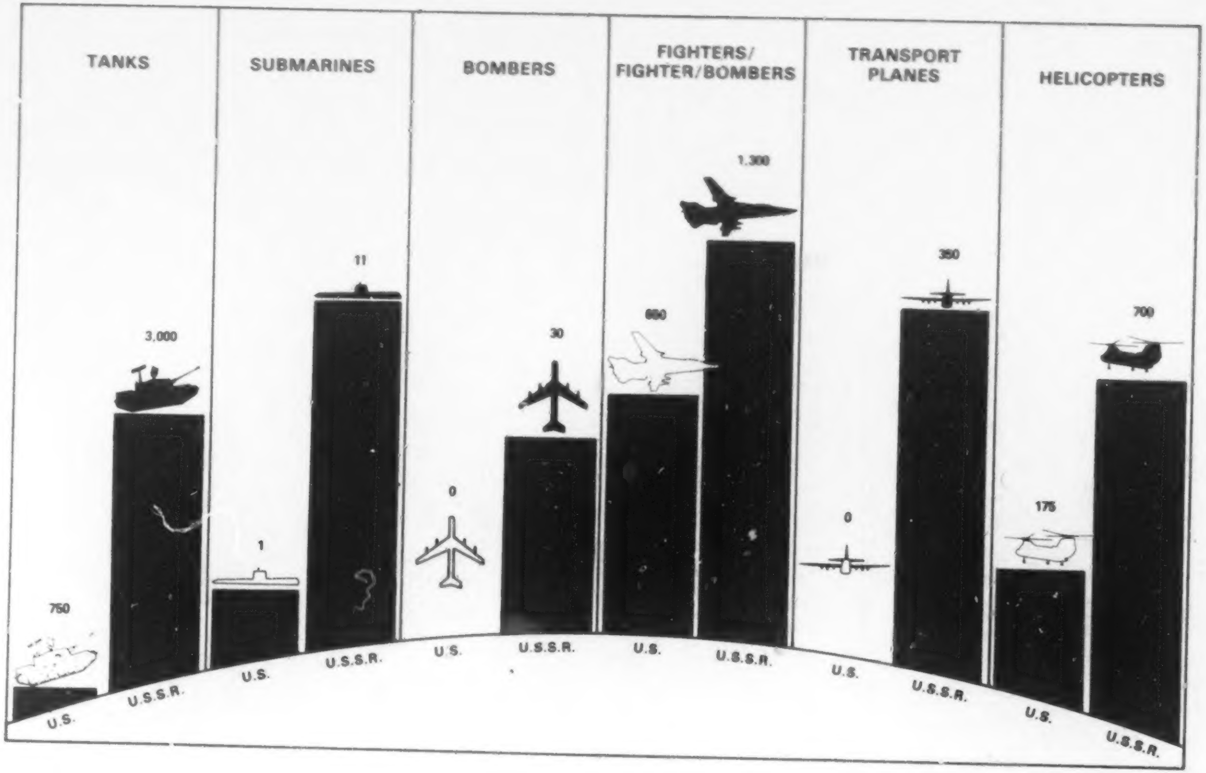
Unfortunately, there are many disturbing signs of significant problems in DOD's management. One of these is the so-called bow-wave effect in which the Defense Department attempts to develop and purchase too many weapons at one time. A report released 3 years ago by the Defense Science Board points out that in recent years a bow-wave equal to approximately one-third of the procurement budget apparently exists at all times. All of these systems compete for a fixed amount of procurement money and the jockeying for funds becomes intense.

Then at budget time there is a mad scramble for funds as every defender of every program lines up to fight for funding. In this kind of fight, the squeaky tank tread gets the most grease, while many useful programs wind up with just enough money to limp along as research projects from year to year. Whether they are useful or not, the costs of carrying too many programs at one time can be staggering. The B-1, for example, existed for 18 years as a so-called research project at a total cost of over $4 billion before President Reagan made his decision to ask for production of the weapon.

As is pointed out in a GAO study which is to be released today, the bow-wave phenomenon exemplified many of the problems plaguing the DOD. The study notes that artificially low DOD cost estimates quickly give way to higher and higher costs and an ever greater squeeze on procurement resources. Higher and higher levels of complex weapons technology result in more expensive maintenance costs and in the purchase of fewer and fewer weapons. The result? The Russians have in recent years consistently outdone us in terms of weapons produced as illustrated in this chart to my left. We are looking at tanks, submarines, helicopters, and planes. They are outproducing us in quantity.

COMPARISON OF U.S., SOVIET WEAPONS PRODUCED

(FISCAL YEAR 1980)



Chairman ROTH. We have, in effect, been engaging in gold-plated unilateral disarmament even without a SALT agreement. Overall, the bow-wave effect, along with associated problems of excessive weapons complexity, inadequate cost estimates and the lack of price competition in procurement have resulted in fewer weapons being bought. There is a growing belief in DOD that there is no value in buying less expensive, less technologically complicated hardware. At least in terms of sheer numbers of weapons, we have spent more money and have less to show for it.

During these hearings we want to ask why it takes an average of 10 years or more for DOD to produce and deploy a major new aircraft while it takes only 7 years on average for the Soviets and 4½ years for the commercial sector to do substantially the same thing. We want to find out why, as pointed out by the Defense Science Board, initial cost estimates from DOD must always be double before they can be called realistic. We want to know why fewer than 27 percent of all DOD procurement contracts each year are competitive even though some studies indicate that up to 25 percent of DOD's procurement costs can be saved through competitive bidding.

The bottom line on these hearings is simply this. Are the American taxpayers going to get all they pay for as DOD begins to spend its new procurement budget? Every consumer asks this question each day. We in Congress can ask no less of DOD.

Senator Cohen.

OPENING STATEMENT OF SENATOR COHEN

Senator COHEN. Thank you.

I have a prepared statement which I would like to submit for the record and just perhaps offer a few comments.

[The statement referred to follows:]

PREPARED STATEMENT OF SENATOR WILLIAM S. COHEN

Mr. Chairman, I want to thank you for bringing together the defense experts that we will hear from today. I think that this Committee is performing a valuable service by holding these oversight hearings on defense procurement and by examining the management practices of the Department of Defense.

As a member of both the Armed Services and the Governmental Affairs Committees, I am dedicated to improving the efficiency of DoD's operations, with the goal of strengthening our national security.

No one is more cognizant of the urgent need to rebuild our national defenses than am I. Increases in the defense budget, as proposed in President Reagan's five-year defense plan, are absolutely essential to ensure that our defense posture is second to none.

But additional dollars are not all that is necessary to improve our defense structure. As former President Eisenhower, himself a five-star general, said:

"If we don't have the objective, industry-government-professional examination that will show us where and how to proceed in this armament business, we will go broke and still have inefficient defenses. We can have security without paying the price of national bankruptcy, if we will put brains in the balance. We cannot afford prejudice, pre-conceived notions, fallacies, duplications, luxuries, or fancied political advantage."

The purpose of these hearings is to provide the objective, thorough scrutiny which President Eisenhower stressed was needed. For without good management, millions will be wasted and our security jeopardized.

It is appropriate that we are focusing our oversight efforts on the procurement process. Not only do the procurement decisions that DoD makes this year affect our defense posture for years to come, but I also believe that procurement is the area where the greatest improvements and largest savings can be achieved.

One need only look at a recent report by the Defense Department's own Assistant to the Secretary of Defense for Review and Oversight—similar to a civilian agency's Inspector General—to find that there are hundreds of cases involving "waste, fraud, and mismanagement" in DoD procurement.

Similarly, study after study has criticized the Defense Department's over-reliance on sole-source contracting when competition would in many cases reduce costs without harming the quality. While sole-source contracts may be unavoidable in some cases or advantageous to the government in others, the fact that two-thirds of DoD's 1980 contracts were non-competitive surely indicates room for significant improvement.

We who believe in a strong national defense have a special obligation to ensure that scarce funds are not wasted because of inefficient contracting procedures. In my judgment, Secretary Weinberger and Deputy Secretary Carlucci share this goal as is indicated by their emphasis on improving and strengthening DoD's procurement policies. Whether their good intentions will be translated into effective reforms, however, remains to be seen.

I do not doubt the sincerity of the present Administration's commitment to improving the defense acquisition process, but many previous defense officials have had similar goals—and, unfortunately, few successes. Although procurement reform is by no means a new topic, we have yet to find the right answers. Over the years, DoD's procurement policy has evolved from Secretary McNamara's total package procurement to Secretary Laird's "fly-before-buy" approach to the present policy set forth by OMB Circular A-109. Essentially, DoD has sought to correct past deficiencies in the procurement process through additional management review and procedural checkpoints.

Despite these efforts, deficiencies in the procurement process still prevail. DoD's "mushroom school of management" has subsequently lengthened the procurement process to the point where acquiring a good or service is both an arduous and costly task. A Defense Science Board study concluded that, over the past 15 to 20 years, the acquisition process has increased in length by approximately five years for the average weapon system. Also, according to the December 1980 selected acquisition reports, the total purchase cost of 47 major weapons systems escalated by $47.6 billion in the final three months of last year. It is painful to realize that this one quarter's cost overrun effectively swallows up the domestic budget cuts we worked so long and hard to pass earlier this year.

As a result of this egregious cost overrun, the Pentagon is forced to buy fewer weapons systems than it had originally planned. Specifically, the Air Force dropped seven F-18 fighter jets from its 1981 buy, while the Army reduced its order for XM-1 tanks by 20, and is negotiating to cut another 45. Moreover, such a large cost overrun results in a "bow wave" effect created by too many programs in full-scale development in relation to the available production funds. The botton line is this: we in Congress are not getting the weapons systems initially appropriated and planned for, and consequently, the U.S. will be more vulnerable to the Soviet arsenal.

Mr. Chairman, the constitutency in this country for increased defense spending will be lost if the Defense Department is exempted from the scrutiny that is applied to other agencies in our search for waste and fraud. I am pleased to join you today in these hearings, and I look forward to hearing from our distinguished witnesses.

Senator **Cohen**. Mr. Chairman, I want to commend you for bringing together the distinguished panel of experts who will appear before us today and the two subsequent hearings that have been scheduled.

I think the committee is performing a very valuable service in holding oversight hearings on defense procurement policies. I am a member of a group which is known as the Military Reform Caucus, which is a rather loose coalition of essentially prodefense Senators and Congressmen on both sides of Capitol Hill, the Senate and House, and both sides of the aisle, Republican and Democratic. On the one hand, members of the press immediately looked at the group as being interested in slashing the defense budget. In fact, I was invited to appear on a major program to talk about how I wanted to cut defense spending. I had to reveal, however, that I didn't want to cut the defense budget but I wanted to increase it. The reaction in the Pentagon was equally predictable and equally pathetic, in my own judgment, where one major general in the Air Force was quoted in a national magazine as saying that this military reform group constituted an internal threat to the military. I thought, my God, have I slipped through a hole and fallen into South America?

Was I in a different continent where elected officials charged with the responsibility of appropriating taxpayers' dollars to fund our defense commitments suddenly constitute an internal threat to the military?

Was I in El Salvador, Chile—where was I?

But I think this sort of sentiment in which reformists are viewed as people who are not interested in a strong national defense is equally erroneous.

So I think these hearings will serve a very valuable function.

I would like to quote from President Eisenhower, himself, a five-star general:

> If we don't have the objective industry—government—professional examination that will show us where and how to proceed in this armament business, we will go broke and still have inefficient defenses.
>
> We can have security without paying the price of national bankruptcy. We cannot afford prejudice, preconceived notions, falacies, duplications, luxuries or fancied political advantage.

I think those words that were spoken several decades ago are equally applicable today and perhaps what is most distressing is that very little progress has been made in trying to come to grips with the problem of defense spending or defense procurement policies.

I would say I am most impressed with Secretary Weinberger and Deputy Secretary Carlucci. Both men, in my judgment, have given evidence of a sincere intent and desire to control spending practices in the Defense Department, but we have seen similar expressions of concern and intent in the past. DOD procurement policy has evolved from Secretary MacNamara's total package procurement to Secretary Laird's fly-before-you-buy approach to the present policies that has been sent forth in OMB Circular A-109, and, yet there still doesn't seem to have been much progress in coming to grips with how we can better control and reduce the waste, and even fraud, within the Defense Department itself.

The chairman has mentioned the problem of sole source contracting. I know Senator Levin and Senator Pryor have also expressed concern about how in the world we can have two-thirds of our contracts procured on a sole source basis.

Why isn't there more competition? We will have Jack Gansler later at these hearings testify about his desire to see more dual-source contracting, and more competition within the industry itself.

Also, we have the problem of cost overruns. According to the December 1980 selected acquisition report, the total purchase cost of 47 major weapons systems escalated by $47.6 billion in the final 3 months of last year.

I think it is painful for many of us to realize this one-quarter's cost overrun effectively swallows up all of the domestic budget cuts we worked so long and hard during the course of this year to achieve.

So, Mr. Chairman, without belaboring the point, I think these hearings are both propitious in one sense and unfortunate in another. I think they are propitious in the sense that at a time when the President is calling upon the Congress to see whether or not we can achieve another round, another level of budget reductions in order to achieve a balanced budget by 1984, that we look at every possible way in which we can focus upon fraud or waste or mismanagement in Government spending. So in that sense, it is entirely appropriate that we have the hearings here today.

In the other sense, I think it is a bit unfortunate because if anyone is to look at the statistics which show a $47.6 billion cost overrun in a 3-month period last year, they will say, this is where we can cut the budget, and that is the area to start making the savings.

That, too, I think will be equally catastrophic because the changes we are going to propose in the procurement process are long-term structured changes which the results and fruits of will not become apparent for years to come.

And so in the short term, I don't see any hope or any opportunity to really make drastic savings. In fact, I think we will probably have to spend more in the initial years in order to achieve more competition and a greater industrial production base rather than spend less. But I do think that we should seize this opportunity to try and shore up what seems to be a diminishing lack of support or a diminution in the consensus I thought was developing that we have to have increased defense spending in order to rehabilitate what I believe to be an adequate defense capability.

Unless we subject the Defense Department to the same kind of scrutiny we intend to subject other agencies and departments to, then I think we will lose that consensus in this country. So I look forward to the hearings, Mr. Chairman.

Chairman ROTH. Thank you, Bill.

Senator Levin?

OPENING STATEMENT OF SENATOR LEVIN

Senator LEVIN. Thank you.

Last week President Reagan invited the Third World countries to model themselves after the American economic system—to follow our lead in our pursuit of and belief in the free market. I hope the procurement officials in the Department of Defense were listening. I wish those models that Reagan referred to were as evident in the defense procurement system as he suggests they are in our overall economy.

These hearings into the defense acquisition system will bring to the fore innumerable problems and recommendations and advice for reform. The problem I see as most egregious is the unwillingness on the part of the Department of Defense to actively and aggressively—even routinely—pursue competition.

Procurement of our major weapons operates in a closed system—in spite, I might add—of a congressional directive to the opposite. The present statute now requires that all Department of Defense contracts be awarded on the basis of formal advertising. Yet in spite of this very clear directive, only 8 percent of all defense contract dollars and 5.5 percent of all defense contracts in fiscal year 1980 were awared on this basis.

The exceptions have become the rule—the tail is wagging the dog. And yet, we live with the knowledge that competition in the contracting process can save from 10 to 25 percent of our procurement dollar.

It has become obvious to me, as I have studied this issue of competition in DOD procurement, that DOD awards too many contracts on a sole source basis—and that too many of these sole source contracts are awarded without adequate justification. For instance, let me quote from a recent letter I received from GAO relative to a review I asked them to conduct into a sole source contract award by the Army.

The GAO wrote the following:

> The Army could not show us evidence from its records or industry analyses to support its decision to purchase construction equipment on a sole-source basis . . . The Army's decision to negotiate a sole-source contract with Caterpillar Tractor Company is not adequately justified and lacks sufficient support documenting Caterpillar as the only capable and willing manufacturer and/or supplier of the construction equipment in question. By restricting all the equipment to be purchased, the Army eliminated several potential suppliers . . . In the future, this procurement as well as others of a similar nature, should be procured competitively.

Moreover, the bid protest procedures for challenging these sole source awards are, in my opinion, a farce. Interested contractors don't necessarily know of their protest rights, or if they do, it may be too late to do anything about it, and contracts are not held up until the protest has been resolved.

I don't think it should go unnoticed that the 32d initiative by Deputy Secretary Carlucci—which wasn't even included in the original document but was added later, as an apparent afterthought—was to improve competition. And then, the recommendation itself was no more specific than to ask the Services to establish objectives for themselves. And, despite GAO's recommendations to the contrary, these goals are not even required to be numerical.

The precipitating factor for these hearings, in our committee, is the tremendous cost overruns we have been experiencing in the development and production of our major weapon systems. I know there are many areas of improvement that can be made as part of this large issue—but competition is certainly a primary one. I will be discussing an example at these hearings in which during just the negotiating stage with a sole source contractor—before the contract itself was actually signed—the cost estimate for the procurement increased from $14 million to $22 million. It is obvious that once contractors have DOD in a sole source situation, it's like a turkey shoot—they've basically got us where they want us.

I am certain that DOD will state at these hearings that they endorse increased competition. Yet I have been fighting tooth and nail with DOD over a simple amendment to the fiscal year 1982 DOD authorization bill which would allow companies an additional 20 days from the present 10 days, to the proposed 30 days, to offer competitive alternatives following announcement of DOD's intent to enter into a sole source contract. All this would do would be to give DOD a chance to look at competitive alternatives.

You would think I was suggesting that the MX should be housed in camping trailers. I am truly dumbfounded at DOD's unwillingness to put its money where its mouth is on this issue and to support modest efforts at obtaining more competition.

While I respect the goals that Deputy Secretary Carlucci is seeking in issuing his 32 initiatives, and the need Secretary Weinberger has recognized to improve the acquisition process, I can't overlook the fact that Secretaries of Defense throughout the post World War II period have observed a similar need. The question is, has there been any significant progress and can we expect any from the Carlucci reforms?

We are faced with a 95 percent real increase in the defense budget over the next 5 years. If that money is not spent wisely and is not adequately accounted for, the public will lose more and more confidence in the defense program. Both DOD and Congress share this responsibility. The worse thing we can do is to pretend to reform, when in reality we are allowing business to continue as usual. That is what we need to determine as we look at these Carlucci initiatives.

Mr. Chairman, I look forward to these hearings. I think they are extremely timely, relevant, and important. I hope their conclusion will be able to help us achieve some movement on specific and beneficial procurement reforms for the DOD and I also want to commend the Chair on the initiative that he has taken in scheduling these hearings.

Thank you, Mr. Chairman.

Chairman ROTH. Thank you, Senator Levin.

Senator Pryor.

OPENING STATEMENT OF SENATOR PRYOR

Senator PRYOR. Thank you, Mr. Chairman.

I think all of us, I say I think, I know all of us certainly want our country to be strong, but the thing that worries me about where we are at this moment in our country's history is that we are attempting to create, with our Defense Department decisions, an illusion of strength.

I am not sure that strength is there. I don't know that weakness is there, but I think we are attempting to create that illusion by simply spending more dollars.

I also would like to point out that as the father of three sons, 21, 18, and 15, that I don't know what we are headed for in a volunteer army or a draft—I hear more and more about a draft than I have in the past years. I must say that as the father of three sons, I think a lot of young people across this country perceive something that probably they perceived during Vietnam that some of their elders did not.

I do not think they look forward to getting into a submarine that has 1,000 welding faults in it. I don't think they look forward to getting on the battlefield with a rifle that won't fire. I don't think they look forward to getting into a tank, a multimillion dollar tank, that won't run, that won't operate when it is supposed to operate. And I think that what they are faced with today, very honestly, and it is a strong accusation, is something President Eisenhower admonished this country about over two decades ago when he told us and warned us of the military industrial complex.

I perceive the military industrial complex today to be not only alive and well, but flourishing and making those decisions today that should be made by this Government. Those decisions, I fear, are being made by high-priced consulting firms and by defense contractors.

I think inasmuch as the Pentagon is attempting to create the illusion of strength, we find the contractors attempting to create the illusion of weakness.

So we have a contradition and we have the wrong forces and the wrong pressures making the decisions today that are committing this country and probably this world into a path of total catastrophe, and it worries me, it worries me beyond belief.

I think, for example, Mr. Chairman, that in these hearings we need to ask the questions, and I hope that we will get the answers in these three hearings, about why 70 percent of our defense procurement dollars, for example, are awarded through sole-source contracts where only a single supplier is involved, or on the basis of factors other than price? I think we need to ask some questions about specific weapons. Let's take the M-1 tank, for example, which had a target cost of about $500,000 a tank in its inception. Today it is about $2½ million a tank.

In the last 3 years, the Department of Defense has awarded contracts totaling nearly $750 million, three-quarters of a billion, for the M-1 program and of this total, our figures indicate that 99 percent of those particular dollars were awarded without any competition whatsoever.

This is wrong. It is ludicrous and, once again, I think we need to know the answers to those questions.

I think that we need to answer the question of why many of these major decisions that commit this country are being made in virtual isolation.

An example of this only occurred when I had the privilege, about 6 weeks ago, of meeting with the Secretary of the Air Force, Mr. Orr, when he told us, and I am talking about our Arkansas congressional delegation, that there was no plan afoot to put the MX into the Titan silos.

Four weeks later—4 weeks later—almost to the day, the President announced his decision that it was possible, and I drew the inference, as a matter of fact, that this is where the MX was going—into the Titans and Minutemen silos. I called the Secretary of the Air Force and I said, "Please reconstruct this conversation for us, Mr. Secretary." I said, "When did you know of this decision?" And he said, "Ten minutes after the President's press conference had already begun." And this is the man, this is the Office, this is the individual who is responsible for the MX program and for the Titan program—not even being a part of the decisionmaking process.

Churchill described the Soviet Union, as I recall—I probably won't phrase it correctly—as a mystery wrapped inside of an enigma.

I think today the decisionmaking process on weapons procurement within the Department of Defense could have the same sort of definition.

Mr. Chairman, I am going to finish, but I want to say one other thing. I think this thing has gotten so blatant that there is an incestuous relationship, as I called it before, this relationship between contractor and Department of Defense and the whole complex.

We see, for example, and I have just chosen a few, just a very few, recent ads from some of the Defense contractors that run advertisements about their particular wares and their particular products that are basically psyching up this country to make certain that the constituencies of all of us make certain that we not only arm ourselves but arm ourselves with the particular product manufactured by these particular firms.

I think that we are in a dangerous situation here where outside forces are making these decisions, and it is almost, as I look at these ads, it is almost like a barber standing out on Main Street telling everybody that goes by that they need a haircut. And I think that is where we are today. I think we need to know how these decisions are being made. I think that we must know how these decisions are being made. I think we must know why, for example, the Defense Department has testified as recently as last summer, against the creation of an independent Office of Inspector General within the Department of Defense where every other department has an Inspector General. These are questions that bother us and concern us and, frankly, I think, are turning us into, I don't know exactly what. I can't even articulate the degree of my concern about where we are at at this point and where we seemingly are not going.

Mr. Chairman, again, thank you for your indulgence. I think these hearings are fruitful. I am glad this committee on oversight has taken this upon ourselves to look into this process because I think it is the most important question this Nation faces today.

Chairman ROTH. Thank you, Dave.

I am going to proceed immediately to our first witness who has to appear at another committee. Mr. Bowsher, we welcome you here in your first appearance as the Comptroller General. We fully appreciate that you have not been on the job so long as to be able to delve into every problem that your agency is concerned with, but we also know you have a tremendous background in public and private life that will be very helpful toward these hearings.

As is our custom, we will incorporate your statement in the record in its entirety, if you would like you could summarize, and I would hope you will summarize. Then, because of the time constraints you have, I will limit each one of us to 5 minutes so that each Senator has an opportunity to question you.

Mr. Bowsher.

TESTIMONY OF CHARLES A. BOWSHER, COMPTROLLER GENERAL, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY WALTON SHELEY, DIRECTOR, MISSION ANALYSIS AND SYSTEMS ACQUISITION DIVISION; ROBERT GILROY, SENIOR ASSOCIATE DIRECTOR, PROCUREMENT, LOGISTICS AND READINESS DIVISION; RICHARD GORMAN, MISSION ANALYSIS AND SYSTEMS ACQUISITION DIVISION; AND HOMER THOMSON, MISSION ANALYSIS AND SYSTEMS ACQUISITION DIVISION

Mr. BOWSHER. Thank you, Mr. Chairman, members of the committee.

I am pleased be appear before this committee and, as you pointed out, this is my first appearance as Comptroller General, and we are here today to discuss, one, the cost growth in weapons systems, two, the Army's potential weapon system acquisition affordability problem that we have just issued a report on, and three, the Department of Defense's recent initiatives to improve its management of weapon system acquisiton programs.

There has been a major concern for years over why the cost of weapons systems have usually exceeded the original estimates. The investments to acquire and operate major weapon systems have a heavy impact on the allocation of our national resources. Currently, the Armed Forces are going through the largest modernization program in our history by making up the inventory shortfalls and the obsolescence caused by the Vietnam war. As of June 30, 1981, there were 47 major acquisitions in development and production and these were being reported in the DOD selected acquisition reporting system.

These systems had current estimated costs of $316 billion, of which nearly $167 billion is yet to be appropriated. Of the total of $316 billion, $171 billion represents cost growth over the development estimates. In our 15-page statement, we go into some of the details, but I am going to summarize, as you suggested, Mr. Chairman.

I would like to point out we have recently completed a review of the budgetary pressures the Army is experiencing as a result of their plans to procure several new major weapon systems. We expect these pressures to become more severe during the next few years. We issued this report just yesterday and we concentrated on the Army's top 14 weapon systems which are expected to consume about 50 percent of the total Army procurement budget during the next 5 years.

These weapons represent an intensive modernization effort the Army began in the early 1970's to develop new armored vehicles, helicopters, missiles, guns, and electronic equipment. Although the budgetary implications of actually procuring these weapons have been known or suspected for some time, it was not until the Army first prepared its 1982-86 procurement plan that the fiscal realities of this long anticipated "bow wave" were actually felt. In the 1981-85 procurement plan, the Army estimate for these 14 weapons was $52.2 billion, but in preparing the 1982-86 procurement plan, the estimate rose by 30 percent to $68 billion. There was a combination of reasons for this increase and, again, we go into that in our prepared statement.

I would like to just say a few words about the Carlucci initiatives. We, in principle, support them. We think it will take some time to see how they work out. We have also seen, as the Senators indicated, past initiatives at the Department of Defense, and we have all been somewhat disappointed that there has not been greater results.

There is one initiative that I would like to specifically talk about today that gives us some concern at the GAO and that is initiative No. 5 in which they propose to change or repeal cost accounting standard 409, depreciation of tangible capital assets, to encourage more capital investment. Our concern is that they want to do this without considering the other related cost accounting standards.

The practical effect of the amendment or repeal of standard 409 would permit the use of shortened depreciation lives, such as the lives permitted by the Internal Revenue Code. Now, this in turn, could result in a great increase in costs chargeable to present defense contracts. We are concerned that the proposal does not establish what a fair rate of return on investment should be, nor does it require that the increased cash flow that might result be invested in additional productivity enhancing capital assets.

CAS 409 was carefully crafted by the Cost Accounting Standards Board and was founded in the cost accounting concept that depreciation costs "should be a reasonable measure of the expiration of service potential of the tangible assets subject to depreciation." CAS 409 is only one of a group of actions taken in the mid-1970's for dealing with the problem of accounting for tangible capital assets. Others included CAS 414, "Cost of Money as an Element of the Cost of Facilities Capital," CAS 417, "Cost of Money as an Element of the Cost of Capital Assets Under Construction," and introduction of a new policy by DOD in 1976 which places emphasis on capital investment in establishing profits on negotiated contracts.

An amendment to CAS 409, without any corresponding review of these other interrelated procurement regulations or standards, I think, should be avoided. We believe that, before the DOD proposal on CAS 409 is implemented, relevant budgetary cost estimates should be prepared and, in particular, the anticipated cost resulting from any proposed amendment should be presented in conjunction with that amendment.

In other words, what we are saying is, don't change one of them until you have looked at what the combination of changes should be and then what is the combined impact of those changes.

Another item I would just like to touch on is a major problem often identified by program managers and other defense officials concerning the lack of consistent and sufficient funding to carry out weapon system programs. This is caused to a great extent by competition between programs and having too many programs approved. Therefore, these programs are fighting for their share of the defense dollar.

We think this has been a big factor in program stretchouts and, therefore, you have to buy your units, planes, missiles, ships, at very high unit costs.

I would like to read more of my statement, but in the interest of time, Mr. Chairman, I would like to take questions at this time.

Chairman ROTH. Thank you, Mr. Bowsher.

I will limit myself to two questions. First, as has been mentioned, practically every Secretary of Defense has instituted changes in procedures in the hopes of realizing cost reductions. So this is a continuing problem.

One aspect of Secretary of Defense McNamara's program was to set or outline cost reduction goals for each of his management initiatives. Do you think that this might be desirable with respect to the Carlucci memorandum? Would the development of goals for cost reduction in the acquisition process be an effective means for all of us—Congress, the President, the public—to judge the effectiveness of these proposals?

Mr. **Bowsher**. I think that is an effective method if the system is done with a great deal of candor and honesty. In other words, I think you accumulate a lot of statistics and, as I remember that system, it deteriorated a little bit in the late 1960's, and some of the items on those lists were of question. I think that, if you can do it so that the goals are realistic and the reporting feedback systems are giving you good information, would be a good system. But I think the integrity of the information and the candidness with which it is put together is very important.

Chairman **Roth**. I would ask you to study that proposal further to determine whether or not it could apply here, whether there would be any means for GAO to show the proposed targets are meaningful and let us know the results of that study.

The other question is directed at competition, which I think every Senator here has indicated we are deeply concerned that the Department of Defense through the years has not used competition as a principal means of procurement despite the fact the law has required that this be the primary basis. I don't have time to ask you about one side of this problem that deals with commercial products and the possible overspecialization and requirements on the part of the Department of Defense, but I will ask you with respect to complicated weapons systems. It seems that too often that while there is competition at the research and development bases, a contractor buys in at a low cost and once he is accepted as the contractor for that particular weapon, he doesn't have any competition down the road.

Now, for example, today the President is proposing that we buy 100 B-1's which will cost around $30 billion, not peanuts by anybody's imagination, and it will take a period of over 10 years to complete. It is assumed that one contractor will build and supply all these B-1's. Why isn't it possible, knowing the specifications and requirements, to develop a second source of competition? Would you comment on that, please?

Mr. **Bowsher**. Yes, Mr. Chairman.

One of the problems is when we have limited buys such as on the B-1 bomber. It is difficult sometimes to develop competition in a weapon system when you are only buying 100, like in the B-1 program, because I expect they actually are building them with even less than assembly line technique. But, I think competition should be explored and I think, in most of the weapons systems, they should tend to go for competition. One of the big problems is, once you have selected a prime contractor, so often most of the follow-on buys go to that same contractor.

One thing I think should be given a lot of consideration is whether you should keep two contractors going down the line further into the process. I think you might wish to explore that here with defense officials.

Chairman **Roth**. The thing that bothers me the most, as far as I can determine, no real effort is made even at this stage to determine whether other sources could supply this kind of weapon. So this is something I shall keep asking each witness today. Our time is very limited. I will turn it over to Senator Cohen.

Senator **Cohen**. Mr. Bowsher, in addition to the concerns exhibited by the members on this committee, I think it is important we also point out that Congress can't quite mount a platform of piety during the course of these hearings. We in Congress have to share a measure of the blame and responsibility for the high cost of procurement as well. In addition to having an inadequate production base for many of our major weapons systems, there are times when we have had an overindustrial production base for systems that are no longer necessary for our national needs and yet we keep these lines open because of political pressure.

In order to keep the jobs flowing in our individual States, I think it is well and good we point out there are tremendous amounts of abuses within the system, but we should not try to absolve or wash our hands of our own responsibility in that cost overrun. That has not been touched upon, but hopefully it will be during the course of these proceedings.

I have a couple of quick questions, Mr. Bowsher. One of the items talked about by the chairman is a lack of competition within the procurement process, and more specifically, the lack of formal advertising for defense goods and services. Under our existing procurement standards there are some 17 exceptions where the Defense Department does not have to formally advertise. One of those exceptions, No. 10, I believe, DOD is exempt from formal advertising where it would be "impractical" to do so. That is a pretty simple but rather broad and ambiguous phrase. I wonder whether GAO has done any studies to see whether Congress should consider tightening, eliminating, or rewording some of the 17 exceptions? Have you done any studies at all as to whether these exceptions are being abused?

Mr. **Bowsher**. Senator, my understanding is we have not done a study the way you have described, but we have looked at some individually to see if it is appropriate.

We have not done an overall study like you suggest.

Senator **Cohen**. Would that be an area in which a study could be done?

Mr. **Bowsher**. I think we should certainly consider that and I will determine what we have done in this area.

Senator **Cohen**. Another recommendation, I think, is one of having an effective, independent review of DOD cost estimates. There is a group known as the Cost Analysis Improvement Group that apparently has a far better record of estimating costs of weapons systems. Do you believe it would be useful of Congress to ask the Secretary of Defense to inform the Armed Services Committee of both the service estimate and the CAIG estimate for the cost of new weapons systems?

Mr. Bowsher. I don't think this is an unfair requirement, Senator. I think also one thing you might want to look into is the amount of capability at the program office which is doing the initial estimates and how many layers of review occur. I think it was you or the chairman that spoke about how much bureaucracy is involved and how much time it takes to get these things done. One of the things that happened in the Department of Defense was that there were so many review layers and not enough emphasis on investments at the beginning so as to be able to determine what was a good estimate. I don't know whether those problems have been corrected. But I think that is an area you might want to look into.

The cost estimate and the review of that cost estimate is very important and, to a great extent, one of the problems you are having in cost overruns is coming from the fact that this is not being done very well.

Senator Cohen. We have two problems, do we not? We have buy-ins at both levels. We have the buy-in at the part of the contractor who underestimates the actual costs it will take to produce this weapons system over the lifespan of the program. We also have a buy-in by the Pentagon that underestimates the cost of the product or reduces the estimate on inflation.

So you have both of them reducing the costs: the Government on the one hand with the inflation factor, and the contractor on the actual cost of producing it, in order to get Congress to approve this particular weapon system. And low and behold, DOD comes out with their December 1980 selected acquisition reports that say we have a $47 billion cost overrun in this 3 month period. The F-18, which we haven't talked about yet, is a classic case of a weapon system that has experienced extensive cost growth. The F-18 started out about $9.9 billion per copy. It is now over $30 billion per copy. Consequently, DOD has gone from roughly a $13 billion program to a $41 billion program.

Now we in Congress are presented with the bill. What do we do at this point? Do we stop production of the weapons system after we spent all of this money in research and development or do we go forward?

Have we had a mission analysis. One of the justifications of the F-18 is that it would be a better system for fleet defense. The Navy subsequently decided the F-14 is better for fleet defense. The principal reason for justification of the F-18, as a result, is gone. As far as dogfight capability, the reengined A-6 is probably better than the F-18. If you ask the Marines if they want close Marine support, they will say let's have the AV-8B.

Now we have a $14 billion program sitting here waiting for congressional decision. How do we deal with that?

Mr. Bowsher. You have to look at each of those problem areas. In other words, just as you say, why are you getting the buy-ins—you have to look at the procurement process. You have to look at the program procurement process in the Defense Department. That is what is happening, you are getting too many programs approved and, therefore, you get a lot of competition for funding and then you get the stretch-outs.

You have to look at the inflation factor. I touched on that in my statement here. They have used an unrealistic inflation factor in all the programs in Defense for 10 years or more. Some day that issue has to be faced up to by some administration to get it on a more realistic basis.

Another item is mission analysis. This has to be worked on at the front end. Again, you can end up with far too many program fighting for too few dollars.

Chairman ROTH. Mr. Bowsher has to leave at five of because he is testifying before another committee. Mr. Sheley can stay and answer additional questions. I must point out Alice Rivlin is also on somewhat of a time schedule.

Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

The present law requires, for sole source contracts over $10,000 that DOD announce its intent to go sole source 10 days prior to the actual contract award. Would you, first of all, think that requirement has done some good in terms of allowing potential competitors to offer suggestions to DOD as to how they may be able to make a good competitive offer? Has it proven useful, that provision?

Mr. BOWSHER. I think it isn't a long enough period, Senator. That is my initial reaction. I haven't delved into that personally.

Senator LEVIN. I wrote you the other day about an amendment that would provide for a longer period of time. Without getting into the question of what exception should be allowed and whether that amendment changes the law, which it doesn't, relative to exceptions, you would at least as of this point support a longer period for such an alternative offer to be received?

Mr. BOWSHER. That is correct, Senator.

Senator LEVIN. Do you have any records as to how well the 10-day period has worked, how many competitive offers have been received each year under the present system?

Mr. BOWSHER. No, we do not at this time.

Senator LEVIN. The present bid protest regulations which allow a potential competitor to object when a contract is going sole source allow the Services to override the protest to the GAO and simply enter into the contract. Do you believe that is done too easily and too often?

Mr. BOWSHER. I am looking at the bid protest area as part of my overall review of the operations of the GAO. I would like to come back to you later, Senator, and give you some thoughts on that whole process because I know there are concerns.

Senator LEVIN. The other day there was a case which we brought to the attention of the Army. I believe that involved a protest which was received in a timely fashion to a sole source award. It happened to be just at the end of the fiscal year. Senator Cohen is very familiar with the flurry of spending issues since he has taken a leadership role in this matter. Without waiting a few days for GAO to respond, we saw on September 30 with a pending timely protest of a sole source award, the Army went ahead and entered into that sole source award so it could get it done by September 30.

Have you had occasions to notice that happens with some regularity and some pattern?

Mr. BOWSHER. There is no question in my mind that it happens at the end of fiscal years, and we get calls on some of those situations. But that too, is an area I am going to look at, Senator.

[The information follows:]

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., October 27, 1981.

B-200266
Hon. CARL LEVIN,
U.S. Senate.

DEAR SENATOR LEVIN: This responds to your staff's October 22, 1981, request for our reaction to your suggested changes to the regulations governing the award of a contract while a bid protest is pending.

The present regulations, which are essentially identical to those in the Office of Federal Procurement Policy's proposed policy letter that your staff references, provide that where a written protest against a proposed award is received, the award must be withheld until the protest is resolved unless the contracting officer determines that (i) the items to be procured are urgently required; (ii) delivery or performance will be unduly delayed if the contract is not awarded promptly; or (iii) a prompt award will otherwise be advantageous to the Government. Your staff indicates that you believe these provisions should be tightened. You recommend that the exceptions be started as follows:

> (i) the supplies or services to be acquired are urgently needed and failure to make award promptly will result in injury to the Government because delivery or performance will be unduly delayed, or
>
> (ii) a prompt award is otherwise clearly in the Government's interest.

We agree essentially with your proposal, since the revised language may indeed help to prevent abuse. We do have one suggestion, however. The first exception in the current regulations is viewed as permitting an award when an item is urgently needed; the second is viewed as permitting award when the item itself is not needed immediately, but the award must be made quickly so that there will not be undue delay in delivery or performance. In view of this reading of the current regulations, your recommended language could be viewed as eliminating the Government's right to make an award in the situation covered by the existing second exception. We suggest, therefore, that it may be more appropriate to substitute the word "or" for the word "and" in your proposed first exception. This would preserve the Government's right to make award when an undue delay would otherwise occur, but only when the delay "will result in injury to the Government."

Sincerely yours,

MILTON J. SOCOLAR,
Acting Comptroller General of the United States.

Senator LEVIN. Thank you, Mr. Chairman.

Chairman ROTH. Thank you, Mr. Bowsher. I know you have to leave now. We may call you back at a later date or have further questions.

Mr. BOWSHER. I will be happy to, Mr. Chairman, and I apologize for having this other hearing and having to run off.

Senator COHEN. You could continue your testimony before the House Armed Services Committee along the same lines.

Chairman ROTH. Whatever time you have left.

Senator LEVIN. I think I have a minute or two and perhaps I can ask the others more specific questions on the bid protest. The present law says that the protest from a potential competitor to a sole source award, a protest which is filed with the GAO, can be ignored by the services under one of three circumstances. Those circumstances are that the items to be procured are urgently required or, No. 2, delivery or performance will be unduly delayed by failure to make an award promptly or a prompt award will otherwise be advantageous to the Government.

Would you agree that at a minimum items 1 and 2 ought to be combined, that we should not allow a sole source award to be made while there is a pending timely protest to the GAO unless the item to be procured is urgently required and the delivery or performance will be unduly delayed? Would you agree that would make sense or have you not delved into this deeply enough?

Mr. **Sheley**. I don't think I can answer that question for you, Senator. You are getting into the legal process and I am not a lawyer. I would like to supply that answer for the record and give you statistics as to how often that happens.

Senator **Levin**. That will be helpful.

[The answer follows:]

In response to Mr. Sheley's proposal to provide statistics; GAO records for fiscal year 1981 show that of a total of 513 bid protests received on Department of Defense contract awards, 61 were received before, and decided after, award of contract.

Senator **Levin**. There is an amendment I will be offering to tighten this up. The yellow light still being on, the third exception is that a prompt award will otherwise be advantageous to the Government. Are you in a position to agree or not that that is simply too loose a standard to ignore the pending protest?

Mr. **Sheley**. Again, I would like to see how frequently that is actually employed before answering, sir.

Senator **Levin**. Thank you. Thank you, Mr. Chairman.

Chairman **Roth**. In accordance with the early bird rule, we call upon the witnesses in the order they call. Senator Pryor, I believe you are next.

Senator **Pryor**. Thank you, Mr. Chairman.

Once a contractor does buy in with the Department of Defense, buys into the contract usually at a very low figure knowing that low figure will not be maintained but will result in an overrun eventually, is there any incentive in our present law for that contractor to stay within the contract bid or to stay within the original price he said he would build that product for?

Mr. **Sheley**. Those incentives can be built in, Senator Pryor, but I think you have to very clearly distinguish, though, when you go into a long-term contract for a major weapon system, there are many changes that occur that are not going to be controllable by that contractor, but you can establish cost and performance incentives, and a number of contracts are built on that structure right now. You would have to adjust back to periods of time for escalation factors, for changes, and so forth, to determine whether or not that contractor is still meeting that original cost target.

One program that immediately comes to my mind is the F-16 program. In the price of a contract to the four European countries there was a "not to exceed price." That does require, though, adjusting backward from current prices to eliminate the inflation that has occurred which is somewhat beyond the control of the contractor, and eliminating those changes which have been mandated to be included in the program.

In that particular instance the "not to exceed price" is still being held. I have seen some other programs, and I can't recall specifically which ones they are right now, where that price has not been held.

Senator **Pryor**. Are these incentives against cost overruns strong enough in the present statutes?

Mr. SHELEY. I think they could be enforced a little more strongly, reinforced and used more extensively than they are now.

Senator PRYOR. Do you feel, and I am contemplating some language on this when the defense bill comes before the Senate, do you feel that a recapture provision would be in order at this time. A recapture not only of excess profits, and I am familar with the Vinson-Trammell Act—I assume that is unworkable, unenforceable or at least unenforced at this time—do you think a recapture provision might not be in order at this point?

Mr. SHELEY. We have testified on that many times, Senator Pryor, and our position has been that profit limitation as a minimum should be standby legislation for use during emergency situations. Beyond that in terms of peacetime, I think it is a policy matter Congress really has to decide. You may want to impose some type of profit limitation during peacetime operation.

Senator COHEN. Would you yield?

Senator PRYOR. Yes.

Senator COHEN. The question really isn't one of profit in the defense industry. That is not where the problem is if you are talking about cost overruns as such. What the Senator is trying to get at is the structural process by which DOD contracts out.

I don't see the problem in the DOD procurement process to be one of profit, but rather, the problem in my judgment is the structure of the process—the selection of contract type and the enforcement of the contract itself. It seems to me we are wrong in looking at the profit side of the defense industry.

Mr. SHELEY. I would agree with you, Senator Cohen, to the extent that it is a relative small part of the total weapon system. The cost portion is the one that has been ignored in the past. The only way you are going to do that is to build in a cost control incentive up front on that contract.

Senator PRYOR. Do you feel that the Department of Defense should have an Office of Inspector General?

Mr. SHELEY. I think they are leaning in that direction. I think you are aware Secretary Weinberger has established a Review and Oversight Office. That may ultimately become the Inspector General in the Department of Defense.

Senator PRYOR. Once again that is, in my opinion, creating an illusion. That illusion is that there is some watchdog within the Department of Defense. I don't want any watchdog being responsible to the Secretary of Defense. I want that watchdog being responsible to us.

Mr. SHELEY. I understand that.

Senator PRYOR. That is why I think we should, I hope, with your support, push for an Office of Inspector General.

Mr. SHELEY. I think you will find Secretary Weinberger has come out with an independent Inspector General, within the Department of Defense, not at the Service level, but within the Office of the Secretary of Defense.

Senator PRYOR. I am not certain of that. We will have to check that. I think testimony was given to the contrary earlier.

[The statement referred to by Senator Pryor on p. 59 follows:]

[From "Inspectors General Legislation," hearing, June 18, 1981, Senate Committee on Governmental Affairs]

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Mr. TAFT. * * *

There is, however, and should be emphasized a fundamental difference between the position which Secretary Weinberger has administratively established and the Inspectors General H.R. 2098 would impose on the Defense Department.

The Secretary's proposal adds a senior official to his management team. That official is fully responsive to the Secretary and has direct access to him. He is also able to provide much-needed assistance in routing out wasteful and inefficient programs.

The national security responsibilities of the Defense Department make it imperative that an Inspector General in DOD have a clear reporting relationship within the command structure. In contrast, the Inspector General established by H.R. 2098 would be an independent official capable of departing from the Secretary's principal areas of concern and/or emphasizing his own priorities.

The unique operational and intelligence requirements of DOD require, in our view, that any such official operate under the authority, direction and control of the Secretary of Defense as is the case for every other official in the Department.

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Those provisions which establish the independence of the Inspector General in the Department of Defense are completely inconsistent with the hierarchal commander, subordinate relationship that is at the heart of any military organization and is embodied in the chain of command.

These provisions do not encourage the individual to work with the Secretary as part of his team. In our view, the Secretary of Defense must have the ability to terminate any review process or investigation that the Inspector General may initiate which would jeopardize national security.

Mr. SHELEY. It was along in the midsummer months when the President himself, I believe, came out in support of that and Secretary Weinberger.

Senator PRYOR. I see my red light is on. Thank you, sir.

Chairman ROTH. Senator Mattingly.

OPENING STATEMENT OF SENATOR MATTINGLY

Senator MATTINGLY. I won't take very much of your time. I feel like I have read all this before and heard it all before. I would like to pose this question also to Ms. Rivlin when she comes up because I might not be here. What we are in need of are some urgent answers on defense, and what we are going to do about the budget impact while building up our defense capabilities because each time something comes up to Congress, the costs are always over what was projected.

Some people blame it on complicated weapons systems, which I don't think is something to blame it on. Of course, we blame it on program managers, we blame it on many things. I heard the comment about cost control incentives being on the up front section in order to control it. I guess I would just disagree with about everything that has been said in that area because it would seem to me procurement in defense is no different than procurement in any other private sector high technology business, whether it be General Electric or some firms in Japan or Germany or IBM Corp., no matter who it may be.

If you use "comparability"—and I don't like that terminology all that well—I doubt that the overruns in the private sector for development of high technology, that is the forecasts that they use, are not off base like they are in the Defense Department. It would seem to me it would be better, I have talked before about a new management mandate, probably new management, but to change the techniques. It is ridiculous that for defense, or any other area that uses high technology, can't get better forecasts of costs of what they are going to manufacture. But you can't blame it on the private sector for giving them that if they probably get clouded views of what they want anyhow.

My question to you is: When we go through all this and we hear and read the same thing in all these testimonies, ever since I have been in the Senate, what is your resolution to the problem? What specifically are you offering to do other than trying to patch a system?

Mr. SHELEY. No. 1, and Mr. Bowsher referred to this in his prepared statement, also in summarizing it, that very few systems are being bought at optimal quantities, they are not being bought at planned quantities.

Senator MATTINGLY. Let me interject right there. Irrespective of whether it is being bought in optimal quantities, if you are buying 25 B-1's, you should be able to get a projection of the cost of how much it is going to cost to build 25 B-1's, or if you are building 750 of them, you would still get a cost projection that should be reliable. That is what we are trying to get at, the bottom line of how do you get to a reliable projection of cost.

I don't care how much it costs a private concern to manufacture 25 or 75 just so long as the company gives me the figure that is correct, so I can go to Senator Rudman on the Appropriations Committee so he will know how much money to budget.

Mr. SHELEY. Let's take it right at the beginning, the 25 that you postulated, you can prepare an estimate that will be a fairly realistic estimate on procuring 25 B-1 bombers and if you buy them in the order in which you prepared that estimate in the quantities and at the timeframes, then the likelihood of you getting closer to that estimated cost is there. If you want to buy 25 and buy them all in 1 year and then you turn around and buy them over a period of 3 years, then that estimate is no longer a valid measuring yardstick for those original costs, and that unfortunately is what happens in most of the programs in the Department of Defense today.

They are predicated on buying at a given rate of production and then there are so many systems competing for the available procurement dollars. Rather than killing a system they will stretch it out. Take the F-16 program, buying 120 airplanes a year at the present time. The contractor is tooled up for 180. We are paying for that additional tooling capacity on those 120 planes.

Senator MATTINGLY. Which gets back to square 1, that you need a better forecast.

Mr. SHELEY. You need a better forecast——

Senator MATTINGLY. As you do in the private sector.

Mr. SHELEY. You have got to buy them on the basis on which you estimated the cost, if you are going to hold DOD responsible for that original cost estimate.

Senator MATTINGLY. I see my time is up.

Chairman ROTH. Senator Rudman.

Senator RUDMAN. I don't have any questions for this witness, Mr. Chairman.

Chairman ROTH. Thank you, gentlemen. We appreciate your being here today.

Mr. **Sheley**. Thank you, Mr. Chairman.

[Mr. Bowsher's prepared statement and responses to written questions submitted by Senator Roth follow:]

PREPARED STATEMENT OF CHARLES A BOWSHER

Mr. Chairman and Members of the Committee:

I am pleased to have this opportunity to appear before the Committee on behalf of the General Accounting Office to discuss (1) cost growth in weapon systems, (2) the Army's potential weapon system acquisition affordability problem, and (3) the Department of Defense's recent initiatives to improve its management of weapon system acquisition programs.

COST GROWTH IN WEAPON SYSTEMS

There has been major concern in Congress for years over why the cost of weapon system acquisition programs usually exceed original estimates. The investments to acquire and operate major weapon systems have a heavy impact on the allocation of national resources. Currently, the armed forces are going through the largest modernization program in our history by making up the inventory shortfalls and obsolescence caused by the Vietnam War. At June 30, 1981, there were 47 major acquisitions in development and production and reported in the DOD Selected Acquisition Reporting (SAR) System. These systems had current estimated costs of $316 billion, of which nearly $167 billion is yet to be appropriated. Of the total of $316 billion, $171 billion represents cost growth over the development estimates. In addition there are a number of other systems in early development which are potential SAR systems in future years. Based on historical records, these systems can expect to experience billions of dollars of cost growth in the future.

Cost Estimating

As far back as the early 1970s, GAO has reported that both planning and development cost estimates on Federal acquisitions in many cases are quite optimistic on technical development problems, cost, and potential performance.

Typically, cost estimates involve a planning estimate and a development estimate. For projects with a follow on production phase there would also be a production estimate. The Congress usually gives its initial approval based on the planning estimate. This estimate should be the best early projection that an agency can make after having considered all pertinent factors. Too often, however, it is nothing more than a rough feel for the potential cost of a project. The development estimate is a refinement of the planning estimate after some degree of project definition work and is usually made at about the time the development contract is awarded. A current estimate is the latest estimate for the project. For purposes of measuring cost growth, DOD has traditionally compared the development estimate to the current estimate.

The Effect of New Technology

The exploration of new technology has long been a major driving force behind new weapon system proposals and will probably continue to remain so in the future. Accurate cost estimates when developing new technology applications are usually difficult to determine. This coupled with threat analyses persuades advocates to attempt to seek approval from Congress for complex, high technology systems with optimistic initial cost estimates. These estimates are usually low and often carry high expectations of solving unknown technical problems. DOD acknowledges that it often accepts low initial cost estimates and this process (usually referred to as "buying in") frequently leads to apparent cost overruns and criticism of its management abilities. The Deputy Secretary of Defense has instituted a new management initiative called "Budget to Most Likely Cost," directed at achieving greater accuracy in cost estimating.

Estimating the Effect of Inflation

The use of optimistic inflation rates in developing cost estimates also accounts for considerable cost growth. The low rates used to project inflation through the lengthy out years of the acquisition program have consistently resulted in underestimated program costs.

On August 6, 1981, the Secretary of Defense set forth his concern that some change is necessary in the way inflation is accounted for in the annual budget in a letter to the Director of the Office of Management and Budget. For the past nine years, DOD has used the U.S. Gross National Product (GNP) implicit price deflator, to project inflation and further adjusted its estimates so as to be consistent with the respective Administration's overall economic assumptions. In recent years, defense purchase prices have risen faster than most goods and services as measured in the GNP and the OMB directed rates for inflation have been below actual inflation. The Secretary's letter proposed three options for consideration but they have not yet been adopted.

GAO has made a number of recommendations over the years to help the DOD get better control over the cost growth problem. They are still valid recommendations today. They include:

For cost estimating DOD should provide for:

(1) An adequate data base of readily retrievable cost data.

(2) An effective independent review of cost estimates, including judgment by top officials as to the realism of the cost estimates on which decisions are based.

(3) More complete documentation of cost estimates, coupled with a requirement for an adequate feedback of results, to provide a basis for comparing costs achieved with those estimated.

--Cost estimates in SARs should be given in a range of probable cost including a single-point "best estimate."

--DOD should reinstitute a chart showing the impact on the program cost estimate of using different inflation rate projections at least as high as the approximate rate being experienced when the SARs are prepared.

--Inflation should be included in the budget year and future costs should be given as a range of costs dependent on different inflation rates and spending profiles. Each year the programs' current estimates would be adjusted to include actual inflation.

--OMB should establish guidelines for DOD and other agencies to adjust budget estimates to account for inflation during the budget processing cycle, so that budgets and cost estimates are expressed in comparable prices.

The Committee may wish to pursue the adoption of these recommendations further with Defense officials.

ARMY BUDGETARY PROBLEMS CREATED BY WEAPON SYSTEM PROCUREMENT

Mr. Chairman, we have recently completed a review of the budgetary pressures the Army is experiencing as a result of its plans to procure several new major weapon systems. We expect these pressures to become more severe during the next few years. Yesterday, we issued our report (MASAD 82-5) to the Congress on this situation. We concentrated on the Army's top 14 weapon systems which are expected to consume about 50 percent of the total Army procurement budget during the next 5 years. These weapons represent an intensive modernization effort the Army began in the early 1970s to develop new armored vehicles, helicopters, missiles, guns, and electronic equipment.

Although the budgetary implications of actually procuring these weapons have been known or suspected for some time, it was not until the Army first prepared its 1982-86 procurement plan that the fiscal realities of this long anticipated "bow wave" were actually felt. In the 1981-85 procurement plan, the Army estimate for these 14 weapons was $52.2 billion, but in preparing the 1982-86 procurement plan, the estimate rose by 30 percent to $68.1 billion. There was a combination of reasons for this increase. First, the existence of overall budget constraints was coupled with the fact that development of several high cost programs were nearing completion and therefore competing for available procurement funds. Second, an emphasis was placed on allocating a greater share of projected

Army funds to near-term readiness of existing forces, thus limiting the amount of funds available for weapons procurement. Third, and of major significance, there was dramatic real cost growth in the procurement estimates of several systems. In order to avoid canceling programs, the Army chose to stretchout the planned production schedules for 10 of the 14 systems--a decision which exacerbated the procurement cost estimates because it guaranteed that in future years more fixed costs and projected higher inflation would be incurred.

Upon taking office, the current administration revised the 1982-86 procurement plan and requested an increase in total obligational authority for the Army which returned many of the weapon programs to more efficient production schedules. This reduced the total procurement cost estimate for the 14 systems by about $2 billion. A further reduction of $4.6 billion was made by deliberately lowering the forecasted inflation rates. This inflation reduction was made in conjunction with the assumptions inherent in the President's economic recovery program.

Although these estimated procurement cost reductions amounted to $6.6 billion, they were offset by a $6.7 billion increase due to real procurement cost growth, increased quantities, and engineering and other program changes. We believe the resulting $68.2 billion estimated to procure the 14 systems is still likely to be understated. This is primarily due to a pattern of cost growth occurring as the weapon systems make the transition from development into production and gain further production experience.

Production decisions have been made on 9 of the 14 systems, but only 3 have had sufficient experience in production where deliveries have actually been made. These 3 systems--the Blackhawk Helicopter, Stinger Air Defense Missile, and M1 Tank--have experienced substantial cost growth largely due to a higher labor hours in production than earlier estimated. Generally, these systems require more labor hours and more machine time to produce than expected, and the contractors have experienced start-up difficulties and quality control problems. To a large extent, the resultant cost increases stemmed from poor assessments of production risks or unrealistic projections of the manufacturing processes required. More problems were experienced when the amounts budgeted turned out to be lower than actual costs. This forced a reduction in the quantities procured which further increased unit costs, pushed the schedule for unproduced quantities into later years, and slowed down the contractor learning rate.

We are also concerned that the costs to operate and support these 14 systems are likely to continue placing pressure on the Army budget as the weapons are fielded. These costs can comprise up to two-thirds of a weapon's total life cycle cost. Adequate operation and support funding (basically consisting of the military personnel and operation and maintenance appropriations) is essential to ensure a weapon system's combat readiness and effectiveness, and a commitment to procure a system now should also be a commitment to support it when fielded.

Unfortunately, operation and support estimates are not as visible as procurement estimates during the weapons acquisition process. They also tend to be more difficult to determine. The

5-year defense program, including the 10-year extended planning annex, which is the mechanism for making weapon affordability decisions on a life cycle cost basis, pays much closer attention to the current budget year and 4 years beyond. For the 14 systems, the next 5 years will be dominated by procurement rather than operation and support estimates.

We believe the Army should give increased attention to operation and support estimates because of the likelihood that more resources will be needed for the 14 systems. For example, about 23,000 more people will be required during the next 10 years, and higher skill levels will be needed to support the new weapons due to their complexity. This demand will occur when the supply could very well diminish because the population of 17-22 year olds is expected to decline by 25 percent between 1980 and 1992. Introduction of the new weapons will also create a greater demand for expendable resources such as fuel and ordnance. This, together with more expensive spare parts, will surely place an increasing strain on the Army's ability to support its new weapon systems.

We have concluded that the Army's procurement cost estimates for its new weapons are probably understated, that a further funding squeeze is likely, and that stretching out procurement schedules is an unsatisfactory alternative. We also believe the Army has not adequately evaluated its ability to provide operation and support resources for its new weapon systems.

We recommended that the new systems deemed by the Army to be essential to strengthening its missions be fully funded even at the expense of canceling or reducing other acquisition programs. We also recommended that forseeable production risks be identified, procurement cost estimates be revised accordingly, and steps taken to forestall or minimize the risks. In addition, we recommended that the additional resources needed to operate and support the new systems be identified and their availability determined when making procurement funding decisions.

We also believe the Congress should be alert to similar financing difficulties that the Navy and Air Force may be having by determining (1) whether procurement cost estimates reflect all costs anticipated when systems make the transition from development into production, and (2) that sufficient resources to operate and support new systems are likely to be available when procurement funds are requested.

NEW INITIATIVES IN DEFENSE MANAGEMENT

This past March, the Deputy Secretary of Defense, Frank Carlucci, established a special steering group to provide recommendations to improve Defense's management of weapon system acquisitions. Time was decreed to be of the essence and on April 30, 1981, the Deputy Secretary announced that some 31 management initiatives suggested by the panel would be undertaken to achieve improvements. Subsequently a 32nd initiative encouraging use of competition was added.

Basically the initiatives are directed at

--reducing acquisition cost

--shortening acquisition time

--improving weapon support and readiness

--improving the acquisition milestone progress review process

--improving the stability of acquisition programs.

Defense has adopted an implementation plan which involves among other things effecting legislative changes, rewriting defense directives, identifying weapon systems for application of specific initiatives, and redirecting people.

GAO's Viewpoints On The Initiatives

Overall, we view the recent changes in acquisition policy announced by Mr. Carlucci as an effort to tighten up management of the acquisition process which we believe is a good idea and a logical and timely effort on behalf of the new administration.

To comment on each recommendation and decision made by Mr. Carlucci would take a considerable amount of time, so I will just talk about some to which we have had an initial reaction.

Assuring implementation, Initiative 23

Perhaps the most important of Mr. Carlucci's initiatives is number 23, "Assure Implementation of the Acquisition Process Decisions." As this initiative says, this plan will not succeed without a . . . "relentless implementation phase." We agree. There have been numerous studies and recommendations going back a number of years, but Defense still struggles to control a process that it has been practicing for many years. As experience has shown, only persistent effort will effect improvement.

Multiyear procurement, Initiative 3

GAO has historically supported multiyear contracting and we commend the present initiative to encourage its use to major weapon systems, when it is based on a case-by-case benefit/ risk analysis. In recent testimony before both the House Appropriations Subcommittee on Defense and the House Committee on Government Operations we supported the legislative initiative contained in H.R. 3519 with one caveat--that we approach its application on major weapon systems carefully until we get an appreciation of all its ramifications. While the DOD criteria appears sound for making multiyear contract decisions on case-by-case analysis basis, there also appears to be a need for a continuous macro analysis which displays the cumulative funding commitment for future years . This is in order for the Congress to decide, notwithstanding the merits of an individual contract, whether its future year authorization and appropriation prerogatives are being overly restricted.

Preplanned product improvement

We also support the DOD efforts in preplanned product improvement (Initiative 2), a method of planning ahead to use advanced technology for upgrading deployed systems. We recently issued a report to Defense (MASAD 81-39, August 13, 1981) discussing the benefits of this method and recommending some key procedures that should be considered. The report was favorably received by the Department of Defense.

Some Initiatives May Be Difficult to Achieve

All of the initiatives reflect good intention on the part of DOD, but some may be difficult to achieve. For example, achieving economical production rates is a commendable desire, but difficult to achieve in Defense programs. Production rates are influenced by many considerations. One of the foremost is that we are in a peacetime environment which limits the amount of Defense funding which in turn limits the amount that can be spent on any one program in a given year. The Under Secretary of Defense Research and Engineering acknowledged 2 weeks ago that it is not possible to increase production rates across the board when understandable contraints are placed on the Defense budget. However, Defense has identified seven programs for production rate increases planned for fiscal year 1983.

Initiatives Meriting Special Attention

Prior to the Carlucci Initiatives, the Services were required to submit a statement of need for each proposed new major weapon system acquisition program to the Secretary of Defense for his approval prior to commitment of resources to the program. Discussion with Defense officials confirmed that Secretary of Defense approval of the Statement of Need would now be accomplished by its submission in the Services' annual budget request and its acceptance in the President's budget rather than by specific approval/disapproval notification to the Services. The Statement of Need document is important. As the Congressionally appointed Commission on Government Procurement found "Defense....programs have suffered when well defined and coordinated statements of need and goals were lacking." OSD should carefully review and validate the Services budget requests to assure that new program proposed are genuinely needed.

Program milestone changes

In the past, the Secretary of Defense maintained oversight of major programs through a process of reviewing progress at four key program transition points. These four reviews have now been reduced to two, one to be sometime subsequent to the Service's initiation of the program and the other when a preliminary design is developed in the engineering phase.

Progress reviews are essential to good management. They require taking a look at both the program's progress and where the program is going at crucial decision times. Decisions that establish the potential for or direct the expenditure of major portions of Defense resources should be approved by the Secretary of Defense. This would be prior to the Service's initiation of the program and when the commitment to production is actually made. Decisions validating concepts and authorizing follow-on production are operating level decisions that could be left to the Services. If properly implemented, this initiative could provide proper review.

Encouraging capital investment to enhance productivity

Initiative number 5 outlines several suggested actions to be taken by DOD to increase productivity in the defense sector of the U.S. economy. While we do not have serious reservations regarding most of the proposed actions, we believe one requires further consideration before it is undertaken.

We oppose DOD's recommendation to amend or repeal Cost Accounting Standard 409 "Depreciation of Tangible (Capital) Assets" without considering other related cost accounting standards. The practical effect of amendment or repeal would be to permit the use of shortened depreciation lives such as the lives permitted by the Internal Revenue Code. This in turn could result in a great increase in the costs chargeable to defense contracts. We are concerned that the proposal does not establish what a fair rate of return on investment should be nor does it require that the increased cash flow that might result be invested in additional productivity enhancing capital assets.

CAS 409 was carefully crafted by the Cost Accounting Standards Board. It was founded in the cost accounting concept that depreciation costs "should be a reasonable measure of the expiration of service potential of the tangible assets subject to depreciation." It was published twice in the Federal Register for comment and during its promulgation hearings were held in both the House and the Senate. Congress concurred with the Standard as promulgated. We are opposed to any amendment that would abandon expiration of service "potential" as a basic principle for measuring depreciation in favor of an arbitrary measure which has been devised for other than cost accounting purposes.

Also as previously noted, CAS 409 is only one of a group of actions that were taken in the mid-seventies to deal with the problem of accounting for tangible capital assets. Others included promulgation of CAS 414 - "Cost of Money as an Element of the Cost of Facilities Capital," CAS 417 - "Cost of Money as an Element of the Cost of Capital Assets Under Construction," and introduction of a new policy by DOD in 1976 which places emphasis on capital investment in establishing profits on negotiated contracts. An amendment to CAS 409 without any corresponding review of these other interrelated procurement regulations and/or standards should be avoided.

We believe that, before the DOD proposal on CAS 409 is implemented, relevant budgetary cost estimates should be prepared. In particular, the anticipated cost resulting from any proposed amendment should be presented in conjunction with the amendment.

Program and funding instability

A major problem identified by program managers and other Defense officials has often been the lack of consistent and sufficient funding to carry out a weapon system program as planned. This is caused to a great extent by the intense competition between the many programs for a share of the Defense budget. Defense officials past and present have acknowledged that there are too many weapon system programs. The Steering Group that developed the management initiatives reported that too many systems were competing for scarce resources and there had been failure and inability to "weed out" low priority programs in order to fully fund and efficiently execute the higher priority programs. Earlier, in February 1981, the Secretary of Defense had highlighted to the service secretaries and others the importance of identifying for elimination, cancellation, or reduction marginal weapons systems whether operational, under procurement or under development.

The results of OSD efforts were announced earlier this month (October 7) by Dr. DeLauer, Under Secretary of Defense (Research and Engineering) when he identified several RDT&E and procurement programs he was recommending for cancellation. The rationale varied but a number were terminated because they did not have well defined requirements. Some weapons systems had already been identified by the Congress for cancellation or cut-back in authorization hearings. Some had also been identified by GAO in past work as marginal programs due to a failure to clearly state requirements and therefore, in our opinion, in need of either being slowed down or terminated. The reasons for the lack of clearly stated requirements is not fully known to us but, in our opinion, OSD could have avoided these costly cancellations or delays by closer examination of the determination of what exactly was needed by the Service to help it accomplish its mission. To this end, a reemphasis of the basic acquisition principle to develop a formal statement of need would help to eliminate cancellations or costly delays.

Mr. Chairman, this completes my formal statement. I would be pleased to respond to any questions you have.

Enclosures - 3

FIGURE 1
SAR PROGRAMS' DEVELOPMENT ESTIMATES, CURRENT ESTIMATES, CATEGORIES OF COST CHANGES AND PERCENT COST GROWTH BY SERVICE AS OF JUNE 30, 1981 (All Figures in Millions of Then Year Dollars)

Service	Dev. Est.	-------Cost Changes To Date In Program Then Year Dollars---------------								Current Estimate	% Cost Growth	
		Qty. Chgs	Engrg.	Support	Sched.	Estimtg	Other	Economc Escaltn	Total Changes		Adjusted for Qty.	Unadj.
ARMY	30963.4	5734.7	2029.7	3406.1	4373.5	20150.3	161.7	7178.8	43034.8	73998.2	102	139
NAVY	80875.6	36255.5	4601.5	5722.2	9865.6	12845.2	1121.6	20099.4	90511.0	171386.6	46	112
AIR FORCE	32828.9	9464.1	3994.4	4750.6	8148.5	2178.1	1000.9	8161.3	37697.9	70526.8	67	115
GRAND TOTALS	144667.9	51454.3	10625.6	13878.9	22387.6	35173.6	2284.2	35439.5	171243.7	315911.6	61	118
Percent of Total Cost Changes		30	6	8	13	21	1	21	100			

Source: Selected Acquisition Reports Summary Tables as of June 30, 1981 (pages 1 and 4 of 5) prepared by OASD(Comptroller), August 14, 1981

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FIGURE 2

SAR PROGRAMS' DEVELOPMENT ESTIMATES AND CURRENT ESTIMATES AND CATEGORIES OF COST CHANGES
AS OF JUNE 30, 1981 (All figures in Millions of Then Year Dollars)

Weapon System	Base Year	Development Estimate a/	Cost Changes To Date in Program Then Year Dollars							Total Changes	Current Estimate
			Quantity Changes	Engineering	Support	Schedule	Estimating	Other	Economic Escalation		
ARMY											
PATRIOT (Fire Sections)	72	5240.5	-1842.5	-313.3	1004.8	970.8	1545.2	27.6	1832.8	3225.4	8465.9
PERSHING II	79	1571.0	-	-6.9	28.6	-23.1	40.1	-	184.5	223.2	1794.2
HELLFIRE	75	735.1	2.7	95.0	17.9	97.2	393.8	-	142.4	749.0	1484.1
CH-47 MODERNIZATION	75	1562.8	545.5	-	74.5	69.9	407.1	-	377.1	1474.1	3036.9
UH-60A (BLACK HAWK)	71	2307.3	-22.0	54.3	-23.2	251.8	3206.3	19.9	1535.6	5022.7	7330.0
AH-64 (AAH)	72	3758.1	-	57.2	195.4	599.4	615.8	-	734.2	2202.0	5960.1
SOTAS (Division Sets)	79	1282.8	-393.4	35.3	82.7	288.1	981.8	-	-38.4	956.1	2238.9
FVS (MICV)	72	726.4	3047.6	1758.7	1028.6	-64.6	5032.7	17.9	234.1	11055.0	11781.4
M-1 Tank	72	4779.4	4784.0	234.5	688.1	658.3	6277.6	-	1164.0	13806.5	18585.9
ROLAND (Fire Units)	75	1119.5	143.1	89.4	358.2	227.7	1020.9	90.0	275.3	2204.6	3324.1
COPPERHEAD	75	1240.7	-643.1	25.5	14.7	371.5	417.0	6.3	138.7	330.6	1571.3
DIVAD Gun	78	3185.8	64.1	-	-6.5	606.1	431.8	-	189.3	1284.8	4470.6
MLRS (GSRS)	78	3454.0	48.7	-	-57.7	320.4	-219.8	-	409.2	500.8	3954.8
ARMY SUBTOTALS		30963.4	5734.7	2029.7	3406.1	4373.3	20150.3	161.7	7178.8	43034.8	73998.2
NAVY											
E-2C	68	586.2	1869.9	158.3	648.0	51.4	144.0	-	241.0	3112.6	36[illegible].8
F-14A	69	6166.0	1730.3	162.3	1085.0	1035.4	638.5	79.7	1320.9	6052.1	12218.1
F-18	75	12875.3	6870.4	381.5	1501.7	965.4	5107.5	-	7595.2	22421.7	35297.0
AV-8B	79	9125.5	-	-	-	-	-5.8	-	-	-5.8	9119.7
P-3C	68	1294.2	4320.6	447.1	432.5	1097.4	191.6	5.9	661.6	7156.7	8450.9
LAMPS MK III	76	3907.6	95.3	101.4	66.0	-43.5	1671.3	-	571.1	2461.6	6369.2
CAPTOR	71	329.2	48.7	226.5	365.8	188.6	385.4	-	7.6	1222.6	1551.8
HARM	78	1357.9	-323.4	14.0	-	764.3	244.6	-	83.7	783.2	2141.1
HARPOON	70	1031.8	65.6	264.1	199.7	82.0	191.0	-	314.8	1117.2	2149.0
PHOENIX	63	536.4	537.9	112.1	149.5	586.3	251.3	57.5	397.7	2092.3	2628.7
SIDEWINDER AIM-9M	76	333.4	70.1	-	10.4	34.4	-6.9	-	-2.2	105.8	439.2
SPARROW AIM-7M	78	894.9	5.6	-	87.9	-82.1	31.0	-	110.2	152.6	1047.5
TOMAHAWK	77	2422.9	-376.4	162.1	382.2	211.7	267.8	-	-29.4	618.0	3040.9
TRIDENT	74	12431.1	10761.2	8.0	58.6	2626.5	779.1	527.0	3139.5	17899.9	30331.0b/
5-inch Guided Proj.	77	500.5	21.6	18.2	-	51.9	206.3	-	-35.6	262.4	762.9
SURTASS	75	259.3	118.1	118.0	19.7	104.8	187.4	9.3	46.7	604.0	863.3
TACTAS	76	601.1	-13.4	107.5	-5.6	32.7	175.2	-	250.1	546.5	1147.6
SSN-688	71	5747.5	6214.4	565.7	284.7	87.3	-680.1	412.8	1942.9	8827.7	14575.2
CG-47 (DDG-47)	78	14083.5	4754.4	862.6	192.3	304.2	1449.9	-	505.3	8068.7	22152.2
FFG-7	73	3244.5	17.7	863.9	242.6	1626.0	1541.3	-	2810.9	7102.4	10346.9
PHM	73/74	726.2	-533.1	6.2	1.2	140.9	74.8	29.4	14.7	-265.9	460.3
CVN-71	79	2420.6	-	22.0	-	-	-	-	152.7	174.7	2595.3
NAVY SUBTOTALS		80875.6	36255.5	4601.5	5722.2	9865.6	12845.2	1121.6	20099.4	90511.0	171386.6
AIR FORCE											
A-10	70	2489.7	78.1	370.5	180.0	1124.7	22.6	28.8	1115.9	2920.6	5410.3
F-15	70	7355.2	460.3	737.3	527.8	1925.5	65.7	767.7	3536.2	8020.5	15375.7
F-16	75	6054.5	5364.7	2412.7	2915.7	1485.6	-278.2	56.4	2250.0	14206.9	20261.4
E-3A (AWACS)	70	2661.6	105.6	47.3	183.3	1218.5	-215.1	-9.8	459.5	1789.3	4450.9
E-4 (AABNCP)	74	484.3	-61.1	22.2	-22.3	559.2	20.6	-	50.2	568.8	1053.1
EF-111A	73	631.9	-	20.3	140.9	371.2	157.4	12.3	82.5	784.6	1416.5
PLSS	77	954.5	-652.5	35.1	-78.9	48.6	98.1	-	68.7	-480.9	473.6
HARM (AGM-88)	78	1052.0	1730.9	-	-19.3	691.7	62.3	-	-67.6	2398.0	3450.0
MAVERICK (IIR)	75	1592.9	1563.3	-	145.6	267.5	393.1	-	166.3	2535.8	4128.7
SIDEWINDER AIM-9M	76	277.6	199.8	-	24.2	63.4	-24.0	-	-30.8	232.6	510.2
SPARROW AIM-7M	78	363.2	920.2	-	55.4	4.9	451.2	-	-216.6	1215.1	1578.3
DSCS III (Space Seg.)	77	893.6	-	59.3	-	67.4	34.1	12.9	101.3	275.0	1168.6
NAVSTAR GPS	79	2306.7	-	-	-	-	18.0	-	-127.7	-109.7	2197.0
ALCM	77	4184.0	-19.1	228.4	158.7	212.0	556.5	-0.2	546.1	1682.4	5866.4
GLCM	77	1527.2	-226.1	61.3	539.5	108.3	815.8	132.8	227.3	1658.9	3186.1
AIR FORCE SUBTOTALS		32828.9	9464.1	3994.4	4750.6	8148.5	2178.1	1000.9	8161.3	37697.9	70526.8
GRAND TOTALS		144667.9	51454.3	10625.6	13878.9	22387.6	35173.6	2284.2	35439.5	171243.7	315911.6

a/ The estimates of Program Acquisition Costs developed at the time of the Secretary of Defense approved full-scale engineering development (DSARC II).

b/ TRIDENT Current Estimate excludes TRIDENT (C-4) Backfit Program Costs estimated at $4531.9 as of June 30, 1981.

Source: Selected Acquisition Reports Summary Tables as of June 30, 1981 (pages 1 and 4 of 5) prepared by OASD(Comptroller), August 14, 1981

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32 CARLUCCI INITIATIVES

#1 -- MANAGEMENT PRINCIPLES
#2 -- PREPLANNED PRODUCT IMPROVEMENT
#3 -- MULTIYEAR PROCUREMENT
#4 -- INCREASE PROGRAM STABILITY IN THE ACQUISITION PROCESS
#5 -- ENCOURAGE CAPITAL INVESTMENT TO ENHANCE PRODUCTIVITY
#6 -- BUDGET TO MOST LIKELY COST
#7 -- ECONOMIC PRODUCTION RATES
#8 -- ASSURE APPROPRIATE CONTRACT TYPE
#9 -- IMPROVE SYSTEM SUPPORT AND READINESS
#10 -- REDUCE THE ADMINISTRATIVE COST AND TIME TO PROCURE ITEMS
#11 -- INCORPORATE THE USE OF BUDGETED FUNDS FOR TECHNOLOGICAL RISK
#12 -- PROVIDE ADEQUATE FRONT END FUNDING FOR TEST HARDWARE
#13 -- GOVERNMENTAL LEGISLATION RELATED TO ACQUISITION
#14 -- REDUCE THE NUMBER OF DOD DIRECTIVES
#15 -- FUNDING FLEXIBILITY
#16 -- CONTRACTOR INCENTIVES TO IMPROVE RELIABILITY AND SUPPORT
#17 -- DECREASE DSARC BRIEFING AND DATA REQUIREMENTS
#18 -- BUDGETING WEAPONS SYSTEMS FOR INFLATION

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CARLUCCI INITIATIVES (CONT'D)

#19 -- FORECASTING OF BUSINESS BASE CONDITION AT MAJOR DEFENSE PLANTS

#20 -- IMPROVE THE SOURCE SELECTION PROCESS

#21 -- DEVELOP AND USE STANDARD OPERATIONAL AND SUPPORT SYSTEMS

#22 -- PROVIDE MORE APPROPRIATE DESIGN TO COST GOALS

#23 -- ASSURE IMPLEMENTATION OF ACQUISITION PROCESS DECISIONS

#24 -- REVISE DSARC (DEFENSE SYSTEM ACQUISITION REVIEW COUNCIL) DECISION MILESTONES

#25 -- INCLUDED THE MENS (MISSION ELEMENT NEED STATEMENT) IN THE POM (PROGRAM OBJECTIVE MEMORANDUM)

#26 -- REVIEW DSARC MEMBERSHIP

#27 -- DEFENSE ACQUISITION EXECUTIVE

#28 -- DSARC REVIEW CRITERIA

#29 -- INTEGRATION OF PPBS (PLANNING, PROGRAMMING, BUDGETING SYSTEM)/DSARC PROCESSES

#30 -- PROGRAM MANAGER CONTROL OVER LOGISTICS AND SUPPORT RESOURCES

#31 -- IMPROVING RELIABILITY AND SUPPORT FOR SHORTENED ACQUISITION CYCLE

#32 -- INCREASE COMPETITION IN THE ACQUISITION PROCESS

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RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., December 8, 1981.

Hon. WILLIAM V. ROTH, Jr.,
Chairman, Committee on Governmental Affairs,
U.S. Senate.

DEAR MR. CHAIRMAN: Thank you for your letter of November 9, 1981. I am glad to have had the opportunity to assist you in the hearings on the acquisition process at the Department of Defense. Enclosed is our response to the issues raised by my testimony.

Please call me if you feel that I can be of further assistance to you in this matter.

Sincerely yours,

CHARLES A. BOWSHER,
Comptroller General of the United States.

Enclosure.

Question 1. Historically, the Federal Government has relied primarily upon detailed design specifications to purchase products to meet its everyday operating needs. Government products, as GAO pointed out in 1980, frequently cost more than comparative commercial products. Currently, there are policies encouraging Government agencies to utilize commercial products off-the-shelf wherever possible. As GAO pointed out, DOD has developed 40,000 documents for purchasing the everyday products it needs and to date its efforts to curb the use of specifications have been "fragmented."

(a) Does DOD continue to use too many specifications in purchasing everyday products?

(b) Is there any estimate of how much could be saved if DOD effectively implemented the Government's policies concerning commercial products?

Answer. (a) Yes, we think it does based on the results of our recent survey.

As a follow up to our January 1980 report [1] on implementation of the commercial products policy, we recently surveyed DOD's progress in developing commercial specifications. The survey disclosed that as of August 1981, DOD had formally processed and approved 23 commercial item descriptions to replace Government specifications. Projects to develop 221 commercial item descriptions were either being processed or scheduled for processing, and 1,445 candidates for projects had been identified.

Another aspect of DOD's efforts is the adoption of industry standards for products and manufacturing processes in lieu of Government specifications and standards. About 800 industry standards were formally processed and approved during the last 2 years, and 617 industry standard projects were being processed. DOD was also using 1,282 commercial descriptions to procure drugs.

In summary, DOD's efforts have produced only limited results to date, but if current procedures continue to be followed they should eventually result in a marked increase of the use of commercial specifications.

(b) We discussed savings attributable to implementation of the commercial products policy with the Office of Federal Procurement Policy during the course of our prior review. We were told that a reasonable estimate of overall savings could not be computed, but savings were inherent in the use of commercial products and distribution channels. Also, as previously noted, the results of DOD's efforts have been so limited that they do not provide an adequate basis for estimating savings.

Question 2. In November of 1979, GAO issued a report entitled "Impediments to Reducing the Costs of Weapons Systems." In that report, the GAO states: "Major weapon costs growth since World War II far exceeds the rate of inflation, and no relief is in sight. Various Department of Defense efforts to restrain costs are worthwhile but unlikely to achieve substantial cost reductions."

Do you believe that this statement, in light of the Carlucci initiatives, is still accurate? If not, why not?

Answer. We believe some degree of success may be possible, but it will depend upon the willingness of the services, contractors, and others to cooperate in implementation of the new initiatives. The Carlucci initiatives recognize the reasons for cost growth and are directed at controlling costs. For example, the Deputy Secretary of Defense's memorandum establishing the new initiatives acknowledges that estimated "program costs are sometimes purposely understated either because DOD is forcing a program to fit available funding rather than the funding it takes to do the job, or because contractors are purposely lowering their cost estimates in order to win a contract * * *."

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[1] "Implementation of Federal Policy on Acquiring and Distributing Commercial Products is Faltering Badly," PSAD-80-13, January 14, 1980.

Initiative number 6, "Budget to Most Likely Cost," is directed at solving this cost underestimation.

The Carlucci initiatives represent a significant beginning to address the conditions cited in our November 1979 report. The initiatives for the most part, however, address new starts, new contracts, new programs, and so forth. Meanwhile, the impact of past mistakes and optimism is well entrenched in major weapon system acquisitions undertaken in past years and will surface over time. This is certainly suggested in our October 20, 1981, report entitled, "Budgetary Pressures Created by the Army's Plans to Procure New Major Weapon Systems Are Just Beginning." As to the future, we are optimistic. However, we believe that unless the principal factors that drive costs upward are overcome (poor estimates for example), there may not be much change from current experiences.

Question 3. Interservice rivalries often seem to drive up the costs and complexity of weapons systems and at times seem to drive the services to procure new weapons regardless of necessity or cost. Do you think interservice rivalry significantly complicates the efficient management of the acquisition process and drives up costs? One example of a weapon which may have been motivated in part by interservice rivalries is the AH-64 attack helicopter and that weapon is plagued with problems as you know. What is your opinion on this?

Answer. Interservice rivalry to the extent that it produces unnecessary duplication in equipment does drive up acquisition costs. However, competition in the research and development phase is often useful and valuable if the better concept wins out in tests and demonstration and is adopted by the competing services. But, if two or more rival systems are allowed to continue on, the costs of production, logistics, support, training, and so forth become very high indeed.

Acquisitions which fall into this category deserve special attention. We believe that the Secretary of Defense should closely review the stated needs of each service before any development is started to perform any potentially joint or common mission. The purpose of this review should be to reduce or eliminate duplicate development programs, and where possible, to direct that weapons be developed for common missions that are performed by more than one service. The Carlucci management initiatives aimed at achieving controlled decentralization of management, particularly the initiatives which (1) increase the estimated cost threshold for designating a program as a major system acquisition and (2) delegate to the service the Secretary of Defense review and approval of the need for a new weapon system before starting an acquisition program, cause concern that a service may start a program without adequately considering other services' requirements.

Question 4. In defense procurement, there is customarily a fierce rivalry during initial competition for an award of a research and development contract. After this initial competition, frequently based on low cost estimates from interested firms trying to "buy in", the winner becomes the sole developer and producer for the particular weapons system over the next 20 years. Why should this be so? Why can't more competition be introduced in the awarding of production contracts as well?

For example, the contract for the B1 bomber is estimated at $30 billion over the next 10 years. This money is assured to go to *one* contractor. What is his incentive to keep costs down? The same is true for the MX missile costing billions more.

Answer. While there are exceptions, in most cases the winner of the initial competition for a new major weapon system does become the sole developer and producer. This is due primarily to the nature of the goods being acquired which are expensive and take years to design, develop, and test. (A recent example of where competition was carried through to the selection of two prime contractors is the Air Force and Navy cruise missile programs. The cost of that competition, however, was several hundred million dollars.) In most cases, the time and costs involved have not made if feasible to carry competition through the production phase. This is particularly true with programs when production quantities are predicted to be relatively small and the cost of extra production facilities very high.

Defense directives and OMB Circular A-109 "Major System Acquisitions" encourage use of competition when acquiring weapon systems. Competition is required to be sought on all procurement by the prime contractor and on Government-furnished equipment. Techniques such as leader-follower contracting, co-development teaming, direct licensing, and multiyear contracting also foster competition.

The extent to which competition has not been used has not been due to a lack of direction or a disregard for competition by DOD, but to the type of goods being acquired and the judgment and experience of defense managers who must develop and acquire these weapons with constrained budgets.

Regarding the B-1, although there will be a single prime contractor, much of the work will be competitively subcontracted to other major defense contractors, subcontractors, and vendors. There will also be audits by DOD to verify performance and costs ascribed to the contracts.

Question 5. Without competition in the acquisition of major weapons, the sole-producer increases the price of his weapon with few restrictions. The government often has little choice but to attempt to "negotiate" and basically accept the cost increases. Doesn't the use of sole-source procurement lock the government to a cycle of cost increases in major weapons buys from which there is little chance for escape?

Answer. In most instances, between the time a contractor has won the competition for a major weapon system and the time when production starts, many hundreds of millions of dollars have already been spent. At this juncture, the amount of money required to develop a second source may be only partially offset by any potential savings to be realized by competition. However, the Government has access to the contractor's records and has instituted sophisticated management systems to monitor the contractor's operations. Each successive sole-source buy is negotiated by the Government based on the best cost information available. Further, the contractor is required to certify that the cost or pricing data provided is accurate, complete and current. The contract price is subject to adjustment if the data is not as certified. Also, one cannot simply attribute the higher cost to sole-source, follow-on contracts or the lack of competition. Optimistic estimating, intentional low initial estimates by both the Government and the contractor, new technological opportunities and changes in threat, as well as unanticipated economic events (i.e., double digit inflation and decreases in a contractor's overall workload) are major drivers which increase costs.

Question 6. (a) Why doesn't the Defense Department use competition in awarding contracts more often? (b) What is it, in your opinion, that prevents the DOD from using competition? (c) Is there an institutional bias against using competed contracts on the part of DOD?

Answer. (a) The reasons that competition is infrequently used in acquiring major weapon systems were discussed in the previous answers. Regarding procurements of lesser dollar value, GAO issued a July 1981 report on DOD noncompetitive procurements (PLRD-81-45). We reported on the decision process which led to noncompetitive contract awards and from a sample of 109 contracts concluded that 25 had been inappropriately awarded noncompetitively. We reported that the basic cause for this was attributable to the failure of contracting officers to follow sound contracting procedures. (See (c) below.)

(b) Some of the factors which could justifiably preclude competition include the type of goods required and the need for a very large investment in plant and facilities to produce relatively low quantities, the need to acquire a specific state-of-the-art technology, the need for goods and services of monopolistic vendors such as utilities or brand name items, and the need to support congressionally mandated social programs or the need to maintain the industrial base.

Some of the factors which could unjustifiably preclude competition include inadequate market research, insufficient development of data packages, use of procurement specifications which exceed the Government's minimum needs, and inadequate procurement planning.

(c) Maximizing competition is a requirement of the Defense Acquisition Regulation and an objective of DOD's top management. If there is an institutional bias against obtaining competition it lies, in part, in the role of the contracting officers who are responsible for maximizing competition. For example, in all 25 procurements where we determined that competition should have been obtained, contracting officers failed to follow sound contracting procedures to ensure that more than one company could satisfy the procurement requirements. Many factors, however, can infringe on a contracting officer's authority. For example, in 18 of the 25 cases, contracting officers acquiesced to specific procurement requests from headquarters or accepted, without adequate support, assertions made by technical and end-user personnel that justified noncompetitive procurements. Major processing deficiencies included the improper use of the public exigency exception, inadequate market research, insufficient development of data packages to ensure competition, and the use of procurement specifications which did not represent the Government's minimum needs.

The failure of contracting officers to exercise the responsibility inherent to their position has been a continuing concern and is specifically addressed in the Office of Federal Procurement Policy's October 29, 1981, draft of its "Proposal for a Uniform Federal Procurement System." DOD is also beginning to focus more on the issue in its recent initiatives to improve the acquisition process by requesting the services to establish specific percentage goals for competition.

Chairman ROTH. Dr. Rivlin, we are delighted to have you here with us today as Director of the Congressional Budget Office. We will follow the same rules and we will incorporate your statement in the record and would appreciate it if you could summarize it.

TESTIMONY OF ALICE M. RIVLIN, DIRECTOR, CONGRESSIONAL BUDGET OFFICE, ACCOMPANIED BY ROBERT HALE, ASSISTANT DIRECTOR FOR NATIONAL SECURITY, AND PATRICK RENEHAN, CHIEF, DEFENSE COST UNIT

Ms. RIVLIN. Certainly Senator. Before I do that, let me introduce my associates. On my right is Robert Hale our Assistant Director for National Security, and on my left is Patrick Renehan who runs our Defense Cost Unit.

In the interest of time, let me summarize my prepared statement. I will be happy to put it in the record and to assist the committee as it continues in what I suspect will be a fairly lengthy process of getting on top of the difficult problem of keeping the costs under control in defense acquisition.

Nobody needs to tell you that this is of the utmost importance at the moment. It has always been important and, as other witnesses have said, there have been other efforts over the years to improve the process. The reason it is so important now is that the prospect of a major buildup in defense acquisition is before us and the numbers are larger than ever.

The most rapidly growing set of accounts in the projected defense buildup is the investment accounts, particularly procurement. The past history has shown, as other witnesses have pointed out and as all the Senators have emphasized, that we tend drastically to underestimate the costs of weapons systems at every stage and then to be surprised. The Defense Department has a long record of underestimating inflation. That is partly because we have all underestimated inflation. We can't blame all of that on DOD. Inflation took economic forecasters by surprise—in part, for good reasons. We are not privy to the decisions of OPEC, for example, and the fact that oil prices doubled in 1979 was not predictable by economic forecasters in or out of DOD.

On the other hand, the Defense Department has used the OMB's estimate of the general GNP deflator as its estimate of inflation for defense. As it has turned out, not only has the GNP deflator been underestimated, but the specific deflators for defense activities, and particularly for procurement, have risen considerably faster than inflation generally. I think it would help to make estimates of inflation more realistic if the Department were to use more specific deflators for particular defense accounts. It would reduce the probability of surprise.

I think there has been some reluctance to use these specific deflators because it is known they will be higher and there is a fear this will become a self-fulfilling prophecy. That is a real danger.

On the other hand, I think that the advantage of having some more realistic idea of what is going to happen to inflation in defense is probably worth it.

The Congress, I think, can improve its oversight of weapons cost increases. The basic problem, of course, is really one of incentives. Unless the Defense Establishment itself really cares about improving the cost estimates, unless defense managers feel that part of what they are rewarded for is being realistic about costs and holding them down, then there really isn't much the Congress can do. The Congress can, I think, make very clear to the Defense Establishment that you care deeply about this, that you are going to keep following up on it, that in your regular procedures the one thing you care most about is that the cost estimates be realistic and that the costs be held down. You cannot solve this problem alone, but you can, by closer scrutiny of prices, get across to the Defense Establishment that you care.

One specific approach is included in the Senate's defense authorization bill. It requires the DOD to report to the Congress whenever the program unit cost of a weapons system, as reflected in the selected acquisition reports, increases by more than 10 percent for systems in production or 15 percent for systems in research and development.

Important as they are, it is possible that these selected acquisition reports come too late to allow the Congress to consider alternatives to weapons systems that have grown sharply in cost. You could seek earlier warning, perhaps by requiring that DOD include in the SAR's some of the cost and performance data now submitted to the Department by defense contractors but not currently available to the Congress. These data make it possible to compare money spent with the amount of work completed. If the proportion of money spent greatly exceeds that of the work completed, the data suggest potential cost overrun. Early warning of such overruns could trigger timely congressional debate also whether the weapon is needed even at higher costs or——

Senator COHEN. Is that your version of AWACS for Congress?

Ms. RIVLIN. Yes.

Senator LEVIN. Did the White House get to you, too, or what?

Ms. RIVLIN. In all of these efforts, of course, you have to weigh the advantages of additional reporting against the danger that you are simply adding to the paperwork. That is a problem in every area. Take second sourcing, for instance. That has been mentioned before and my statement contains a strong endorsement of the principle of second sourcing. The potential for substantial saving through second sourcing is great for certain kinds of weapons systems if the buy sizes are large enough. Clearly this is an avenue that should be pursued, although, again, not on every contract or it may simply result in excessive paperwork that gets filed away.

Another item that has been mentioned before is the encouraging of economical buy sizes. I won't go through that argument again, but we think it is of very great importance in keeping costs down.

Then there is the question of fostering multiyear procurement, which again has potential for considerable savings. Here, some of the savings may have been exaggerated. Sometimes the savings from multiyear procurement result only from buying more in the first year when the costs are lower, and you can do that without a multiyear contract. Nevertheless, the potential saving would make it worth pursuing.

My statement ends with a little discussion of why it is difficult to estimate the budgetary savings from these various avenues. This is not an argument for not doing it, but only the observation that it is often difficult to say how much you would save.

In addition, of course, in holding down the costs of defense the Congress should look beyond the question of how the Department budgets and contracts for weapons. The Congress should also focus on alternative ways of accomplishing defense missions, especially those for which the costs have grown sharply. This consideration has led some to question the role of very large ships in the Navy, or whether we need a tank as fancy as the M-1, or the combat vehicles the Army is now procuring, or the F-18 aircraft among others. The Congress might also ask whether U.S. defense priorities would permit less emphasis on certain missions—for example, those involving NATO and its strategic defense. These are contentious topics beyond the scope of my testimony today, but clearly they are areas in which major dollar savings might be accomplished quite beyond the question of contracting.

We are embarked on a substantial buildup in defense, and I believe that the Congress can play an important role in making sure that this buildup is effective and that the moneys are efficiently spent. This is an area in which the CBO stands ready to help you to the extent of our ability, and I will be happy to answer any questions.

Chairman ROTH. Thank you, Dr. Rivlin. You are correct, it is my intent to have this kind of a hearing on a continuing basis. We have three such hearings scheduled now and we will continue them at a later date so that we will be calling further on you and CBO for assistance.

One of the questions I asked earlier of the Comptroller General is when Secretary McNamara presented proposals to institute savings and cost reductions, he outlined a number of cost reduction goals as a means of trying to judge the success of each of these initiatives.

Mr. Carlucci has not done that with his proposals. Do you think that would be a management tool that would be helpful both within the Department of Defense, as well as Congress, to evaluate the success of these efforts?

Ms. RIVLIN. Yes, I do. I think it is always useful to have a goal, and the process of thinking what the goal might be is probably as useful as the goal itself. It lends more specificity to the thinking. It seems to me an effort that ought to be made, although as I said earlier it is often difficult to estimate what the savings might be so as to have a realistic goal.

Chairman ROTH. You also heard me ask a question with respect to second sourcing. There seems to be a concept at DOD, that when you have a complex weapons system that sole source is the only avenue. But let's go back to my case again. We are being asked to fund the procurement of 100 B-1's, which is not an inconsiderable number, that costs $30 billion, as I understand it, at least those are the best estimates today. It will take over a 10-year period to acquire them. Should it be required that some kind of a consideration be given in this set of circumstances to secure competition?

Ms. RIVLIN. I would think it should be required that the Defense Department think about it and explain what it is doing. Whether second sourcing on the B-1 bomber would make any sense or not, I don't know. It may be the buy size isn't big enough to justify that for the prime contractor, but it certainly should be thought about, and the pros and cons weighed and discussed with the Congress.

Chairman ROTH. I agree with you. We don't want to build in a lot of requirements of paperwork that have no practical impact. Yet, if there could be some such requirement, I think it might not be so easy to follow it into sole sourcing. Contractingwise, it is much easier, I think, to just depend on some source.

In your studies of the defense budget and inaccuracies in the past of cost estimates, have you endeavored to secure a total figure in the outyears as to what the defense budget, the procurement cost will be?

Ms. RIVLIN. Yes, I believe that we actually have it in the statement, on page 5. This is an estimate using our deflators. If the administration's planned purchases as of the midsession review were reestimated using our more specific defense deflators, defense budget authority would be higher by $4 billion in 1982 and by a total of $81 billion over the next 5 years.

We have not recosted the October plan. It might be somewhat lower. The point is that the numbers might be large.

Chairman ROTH. Final question.

In a February 1981 report, entitled "Reducing the Federal Budget—Strategies and Examples," CBO does have a section entitled "Increased Efficiency in Defense Procurement."

There you note there have been several studies which indicate prudent efficiencies in DOD might produce savings of $22 billion in budget authority and $16 billion in outlays over a 5-year period.

Obviously, if these savings could be achieved, that is far more than the President has recommended cutting out of defense programs without actually harming program effectiveness.

Would you care to comment upon these suggested savings and what steps we might take?

Ms. RIVLIN. In that report, we were really trying to show that the magnitude of the savings might be very large. Those numbers simply result from saying that, if we could make a 5-percent savings in procurement and research and development, it would be a lot of money; $16 billion in outlays is the estimate of how much a 5-percent reduction would save over a 5-year period.

In that report, we discuss many of the things we have discussed this morning—second sourcing, multiyear contracts, and others. Some of the savings from those approaches are higher than 5 percent. We did not attempt to make a new judgment. We don't have a large enough staff to do that. We were merely suggesting that the potential savings are large, and that even a 5-percent cut would lead to a very large number.

Chairman ROTH. Senator Levin?

Senator LEVIN. Thank you, Mr. Chairman.

The questions that I have mainly relate to competition.

Are you familiar with the study showing the savings that result from competition as compared to solesource acquisition?

Ms. RIVLIN. We are familiar with some of them, yes.

Senator LEVIN. Would you concur that there are substantial savings that result from competition?

Ms. RIVLIN. Yes. Not always but often, yes.

Senator LEVIN. Have you seen any quantification of the average savings, or have you made any yourself?

Ms. RIVLIN. We have not made any ourselves. We have looked at the studies. Let me see if my associates would want to comment on that.

Mr. HALE. The studies generally deal with particular cases, Senator Levin, and in those cases, there are some potential savings. The problem is generalizing, since the savings come from particular aspects of a weapons system and we are not in a position, I think, to generalize as to how much savings could be achieved throughout the defense budget.

Senator LEVIN. Are you familiar with the requirements that the DOD on sole-source awards announce their intent to go sole source 10 days prior to the actual contract award?

Ms. RIVLIN. Yes.

Senator LEVIN. Is that something that comes within your purview?

Ms. RIVLIN. That is something we know about.

Senator LEVIN. Do you have any experience with that time period so you could indicate whether or not you might support an amendment which we are trying to get through our conference which would increase that 10-day period to 30 days, a proposal which has brought about the opposition of the Pentagon for reasons which are not clear to me?

Ms. RIVLIN. I wouldn't want to take a position on the exact number of days. It would seem that a longer period would increase the chance that you would actually get some effective competition. From the point of view of the Department, it would slow things down.

Senator LEVIN. Would you be willing to take a more specific position if we got you the language of that amendment?

Is that something you are able to do?

Ms. RIVLIN. I don't think it would be terribly useful to have us look into that. It would take more specialized knowledge of particular contracts than we are likely to have.

Senator LEVIN. Are you familiar with the bid protest procedures? Right now we don't have enough competition. A very small percentage of our contracts go competitively.

Ms. RIVLIN. Right.

Senator LEVIN. We have that 10-day period for others to make competitive bids, which has proven totally inadequate. Even if there is a protest, however, to the GAO on a sole-source contract, a protest from a potential competitor, the service can simply go ahead and enter into the contract despite the pending of that protest.

The present law permits that in accordance with the list of exceptions which I read this morning and which I think you heard.

Do you believe we should change those provisions so that it is a little bit more difficult to go ahead and enter a sole-source contract where there is a pending protest with the GAO?

Ms. RIVLIN. In principle, I support the idea of increasing the amount of second sourcing. I think the Comptroller General is in a much better position to evaluate the details of the proposal you describe. GAO is involved in this procedure and knows more about it.

I wanted to see if my associates agreed with that.

Senator LEVIN. I am interested in the effect of the Carlucci initiative on the milestone decisionmaking process. As I understand it, part of the proposed change will mean that the development costs of an acquisition upon which the Congress relies to determine cost growth will be estimated at a later stage than in the present system. It will be determined after full-scale development has actually been initiated.

I am wondering whether or not you understand from that proposal how much full-scale development will have occurred before the development cost is determined and will this fact just focus in even more to completing a weapons system before we understand the full cost of it?

Ms. RIVLIN. There might be that danger, but the tradeoff is that you get a better estimate if you are further down the track. We have not heard exactly what they are planning to do on this.

Senator LEVIN. And you haven't given your own opinion then as to the wisdom of it?

Ms. RIVLIN. No.

Senator LEVIN. Thank you, Mr. Chairman.

Chairman ROTH. Senator Cohen?

Senator COHEN. Thank you, Mr. Chairman.

Ms. Rivlin, I wish Mr. Mattingly were here since he asked you this question earlier.

Why is it we cannot get an honest or credible estimate of weapon systems cost?

I think the answer is rather clear. It's economics, on the one hand, and politics on the other. To give you an example. If, for example, each service had to come forward with its systems, the Air Force might come forward with the MX, CX, the F-15, F-16, the B-1 bomber, the ATB or self-bomber; the Army would want its XM-1 tank; the Marines, attack helicopters; and the Navy would want 600 ships, including a battleship.

Here is a realistic cost assessment of what we need. If that were done, what do you think the reaction of Congress would be? We would most likely say that Congress could not afford such a package. Congress would ask the services to go back and redo their figures and come up with something more realistic, realistic in the sense of what Congress is going to accept.

What actually happens is we in Congress are presented a bill which on the face, well, is not too bad. You have a situation in which each service, the Defense Department, buys in, as such, by lowering the cost estimates. Consequently, we are bought out if we have to then pay the bill. Isn't that essentially it?

Ms. RIVLIN. Yes, I think you have put it very eloquently.

Senator COHEN. Putting it and resolving it is quite another matter. For example, I think it is almost too late by the time the bill comes to Congress. The cost-estimating decision made at the Secretary of Defense level, is almost too late.

I will give you an example of what we are talking about. The F-18 has become a matter of some controversy because of its cost. We have the prototype; we have the flyaway models now and lo and behold, in the paper this morning we find the Australians have decided to buy 50.

Now what happens if Congress says we cannot afford a $41 billion program which is more than the B-1 bomber. Are we going to say to Australia, "No F-18's."

Then the Australians would come back and say, "I suppose, if the United States is not going to produce them, we cannot buy them either."

So now you have another little layer of political bureaucracy built up that if Congress fills the F-18, they also fill the Australians. I assume the manufacturer is not going to build them 50 F-18's. That is the way in which the system is run. We have a proposal for the CX. We need more airlift capability, and now we have a proposal for a new aircraft to do it.

Well, some of us have been skeptical saying, "Let's see what it looks like? No, you cannot have $250 million for the CX until we see the plans." The Air Force Journal will then say, "Cohen, or so and so, kills CX transport plan endangering our national security." That is what Senator Pryor was talking about before. So I think we understand why you have low-cost estimates because of the political considerations.

Unfortunately, by the time we get to it, it is almost too late. These oversight hearings are well and good, but what they might only serve to do is show that Congress has no control other than an arbitrary control. By the time it reaches our desk, all we get is the bill and we have no option but to either pay the bill or reject the system.

If you reject the system, you have endangered the national security. If you pay the bill, then you are contributing to the overall inflationary spiral. That is just a personal statement, not a question.

I do have a couple of questions on your testimony.

Do you think you are getting enough independent cost estimates? Is the CAIG estimate currently being disregarded and not being given enough weight, in your judgment, within the Department of Defense?

Ms. RIVLIN. I think in principle we are not getting enough independent cost estimates soon enough.

Let me see if my colleagues want to comment on that?

Mr. HALE. We certainly don't get to sit in on the review sessions. One hears many stories that the CAIG estimates are not widely considered.

Senator COHEN. If you had more independent estimates and analyses in the beginning of the DSARC process, it seems to me you force the Secretary of Defense to make the decision which weapons system the United States can afford.

As it is now, we are getting all of the systems at a lower than realistic cost and then finding out we cannot really pay for it. Consequently, we stretch out the buy, thereby contributing more to the cost and we say: "My God, how did we get into it?"

Mr. **Hale**. It isn't that we don't know what the best estimate of the cost is, although there is a wide range of uncertainty because of the technological risk that is involved.

The Defense Science Board argues that we do know what the best cost is, that the people involved know. The problem is politics. There is a strong incentive not to accept those estimates. I think a solution of that has to come basically from the Department of Defense. They have the data, they have the information. I sense that what the Congress can do is try to change the incentives so the Department would have a stronger incentive to give you the best cost estimates.

We tried to offer a few examples of what you might do—demand to see the budget reevaluated using special budget deflators, require some early warning where there are potential overruns by looking at the SAR's, and also perhaps at the cost and performance data. You mentioned another possibility, which would be to ask to see what the independent cost analyses were on specific major weapons.

I think all those sorts of procedures might change the incentives and result in a better set of estimates.

Senator **Rudman**. Doctor, following on Senator Cohen's questions, I wonder if we could perform a great service by doing something analytically that I have not found in reviewing many of your reports, which are excellent, but we haven't really looked systematically at the entire procurement process. By that I am talking about taking a number of systems, particularly those that are covered in the amendment to our authorization bill, which was offered by Senator Stennis, Senator Nunn, Senator Mattingly, and myself.

I agree with you that that is a step, but a very small step because by the time we get that information, it is probably going to be a little late to refute the arguments that we have already spent so much money; how can we stop now?

I wonder if it would be feasible for CBO to prepare a report which might take some time in preparing but might be worthwhile in covering these three points. Take the 50 major systems that we are talking about in our amendment to our authorization bill; first take your testimony about the prevalent tendency to bid unrealistically low with the hope most often fulfilled of increasing costs later.

Take each of those systems and give us a cost track of those bids on those 50 systems, and peg them each fiscal year, that is (a); (b) work with the Defense Science Board, and I think this might take committee participation to do this, and get an evaluation of those 50 systems as to whether or not the specifications set forth at the time were not unrealistic.

I have had people on that Board and people who I consider eminently qualified tell me that the revolutionary approach to the state-of-the-art developments in some of our new weapons systems has inherently built-in costs that have escalated beyond anybody's expectations.

That would be the second component of the study of the 50 systems.

And third, particularly in the research and development area, provide to this committee and to the Congress a track of the cost progression based on original research and development estimates because what you are going to find, it seems to me, is what I have already found in two systems, that in many cases, 70 or 80 percent of the estimated moneys were spent and maybe less than 10 or 15 percent of the work was actually accomplished. I don't believe the Congress will be able to address this until we see, essentially what I believe is a national scandal, that these systems, not just the three or four Senator Cohen has alluded to, but probably in all 50, each of these three factors has essentially leveraged the cost beyond belief.

I wonder whether or not that is the kind of a project which you could undertake on all 50 systems if it takes 3 years to complete. It would be worth it once we receive it.

Ms. RIVLIN. It seems to me that if we could do it we would all learn a lot as to what really drives the system. It would be a major undertaking. I don't think we have the staff to do it alone. I would suggest we talk further about this and include the Comptroller General in the discussion, and see whether our two agencies could figure out a way of staffing this.

Senator RUDMAN. The reason I ask you this question here at this hearing this morning is that I am convinced that this arguing about inflation, and we carry on these arguments before the Defense Appropriations Committee on a regular basis, is really no solution because the Defense Department can argue with some justification that they should not be blamed for inflation.

Of course, the entire economy is indexing and so are these costs, but when you ask them to come down and pin down that part of these programs which was affected by inflation, in many cases the answer is very surprising. Not until we have a systemic approach to this entire problem will we ever do anything else, it seems to me, except continue to have oversight hearings and essentially say the same thing.

I would hope that this is something you might look at because I am convinced that if we don't, we will lose whatever consensus we have to increase our national defense.

Ms. RIVLIN. We would certainly be glad to discuss this possibility. As I said, I think the discussion should include the Comptroller General, but it seems to me it is the kind of effort that the Congress could undertake and would elucidate the problem a great deal and make the Defense Department realize that you understand the problem and you are serious about it.

Senator RUDMAN. Thank you.

Senator PRYOR. Mr. Chairman, may I say I appreciate Senator Rudman's request and the suggestion he has made to Dr. Rivlin and her office. On that same line of questioning, I just have one question, and then I have about a 1-minute period.

Dr. Rivlin, I am not on the Appropriations Committee, and I am not on the Armed Services Committee, and I don't have access, it seems, to a lot of things, but just in the way we do things in our office, I have assigned one staff member the chore of trying to come up with how much we have spent on the MX thus far.

I am getting ready to make a point. It looks like in the neighborhood of $984 million was spent to study the multiple protective shelter situation which has now been shelved. It has been annihilated. In MX missile-related areas, in the past years, it looks like, and I am not sure these figures are correct, about $2.93 billion. This all adds up to $3.9 billion thus far spent for a missile system for which we still don't know what to do with, and for which we still have no missiles. We don't have any MX missiles. I was just asking my friend, Senator Levin, where can I go and see an MX if I wanted to? He said, "I don't think you can because there aren't any."

Mr. LEVIN. Except my office. We have one.

Senator PRYOR. Maybe your office. So we spent $4 billion, let's say, thus far, and still we don't have a missile. We have some holes around in the country we might put them in, but we really don't know what we are going to do with it. And in the same vein I would like to make a point about an issue that is near to my heart, and also in my neighborhood, and that is nerve gas. I have opposed that. We are about to go off on a several-billion-dollar program for nerve gas. We don't know where to put the nerve gas. None of our allies will accept nerve gas on their soil. They are not going to deploy it. We don't know what to do with it, but we want to make it. We have enough now to kill everybody 500 times on the face of the Earth. We want to do it because it does something for our virility. It makes us feel strong and macho. Maybe we ought to ride off on a black motorcycle with a black leather jacket. I feel that is what we are doing with a gas mask on. In what we are doing on this madness we are off on, this course we are into, the bottom line, do you feel like we are buying now and deciding later what to do with all these things we are buying? Do you feel that way?

Ms. RIVLIN. Yes, I do.

I think the MX basing decision has been an example in both administrations of buying something that we don't fully understand. At least those of us who work with the Congress feel pretty frustrated that the decision process did not seem to be thoughtful, open, and one that everybody could comprehend. An awful lot of money, not to mention all of our survival, is involved.

Senator PRYOR. Dr. Rivlin, and Mr. Chairman, with your indulgence, I don't have another question—it seems like I made more speeches than asking questions this morning. I think I can do this in the 60 seconds I have remaining.

With one of the witnesses before, the GAO—Mr. Sheley, we engaged in a little colloquy relative to the Defense Department's position on the independent Inspector General, and with the committee's permission, Mr. Chairman, I would like to ask unanimous consent that immediately after his statement that I be able to insert the statement given on June 18 by William Howard Taft IV, General Counsel for the DOD in testimony against the Inspector General concept being implemented or in the Department of Defense.[1]

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[1] See p. 24.

I am not in any way disparaging of Mr. Sheley's statement, but I do not think that he was aware of the particular statement of Mr. Taft. It is a negative statement——

Senator COHEN. Wasn't that the last administration, though?

Senator PRYOR. No, this was June 1981. It wasn't that far back. I would like to read one or two paragraphs.

"These provisions which establish the independence"—This is Mr. Taft—"of the Inspector General in the Department of Defense are completely inconsistent with the hierarchial commander subordinate relationship that is at the heart of any military organization and is embodied in the chain of command.

"These provisions do not encourage the individuals to work with the Secretary as part of his team. In our view, the Secretary of Defense must have the ability to terminate any review process or investigation," and it goes on from there. I would like to add the necessary paragraphs which would indicate the opposition of the Department of Defense to the independency of the Inspector General's Office.

Chairman ROTH. I think Senator Levin has one more question. We do have two more witnesses, so that if any of the others have additional questions, I would ask they submit them in writing to Dr. Rivlin.

Senator LEVIN. Thank you, Mr. Chairman. If I could ask you, Dr. Rivlin, to give us an analysis before, if possible, the Defense Department appears at our next hearing of that proposal of Secretary Carlucci to, in effect, delay the estimate of the cost of the system. We would be put in the position of proceeding to full-scale development under that proposal without knowing the cost and you say we will get a better cost when we finally get it, I am sure that is true, we will get it after we make a critical decision.

We will be making a decision on whether to proceed to build systems without the benefit of better available information we have on cost. If you could try to get the details from Secretary Carlucci prior to his appearance here so that we could have your analysis of that proposal in hand at the time he appears it would be most helpful to us.

Ms. RIVLIN. We will do the best we can.

Senator LEVIN. Thank you.

Chairman ROTH. Thank you, Dr. Rivlin. We appreciate you being here today and we will call on you further. Thank you, gentlemen.

Ms. RIVLIN. Thank you.

[Dr. Rivlin's prepared statement and responses to written questions submitted by Senator Roth follow. In response to a posthearing question asked by Senator Roth, Dr. Rivlin furnished information concerning the B-1 bomber. This information also follows:]

PREPARED STATEMENT OF ALICE M. RIVLIN

Mr. Chairman, I am pleased to appear before this Committee today as you review the defense acquisition process. Such a review is certainly timely, both because of the proposed buildup in defense investments and because of widespread criticism of acquisition procedures. That criticism has covered almost every aspect of the acquisition process: its length, the costs and reliability of the weapons purchased, and the management of the process itself. Today I will focus on one key criticism—the troubling growth in prices of weapons systems. I will discuss some possible changes in acquisition procedures that might hold down cost increases and suggest steps the

Congress could take to effect those changes. Also, I will discuss the difficulty in estimating the budgetary savings from changes in acquisition practices.

REVIEW TIMELY BECAUSE OF DEFENSE BUILDUP

A gradual buildup in the real levels of the defense investment accounts—which include weapons procurement, research and development, and military construction—began in 1979. This Administration has proposed a substantial acceleration of that buildup. Based on plans announced last month, defense investment will grow from $68 billion in budget authority in fiscal year 1981 to $89 billion in 1982 and $175 billion in 1986. After adjusting for inflation using the Administration's assumption, this translates into a real increase of 95 percent between fiscal years 1981 and 1986. By contrast, the defense budget as a whole will grow by 52 percent in real terms over the same period, underscoring the Adminstration's emphasis on investment.

Some of the growth in investment stems from plans to buy more weapons. In fiscal year 1982, for example, this Administration proposes to buy more major weapons than did the previous Administration; the added buys include 3 new ships, 67 new fighter aircraft, and 232 new tanks and fighting vehicles. Proposed buys of smaller weapons and of spare parts also increased.

But not all of the increases in investment costs stem from larger buys. Some result from a troubling growth in defense prices. In recent years, the price deflator for defense purchases has increased faster than the overall gross national product (GNP) deflator. Between 1972 and 1980, for example, the difference averaged about 1.7 percent a year. Lately, that gap has widened, amounting to an average of 3 percent in 1979 and 1980.

Moreover, unit price increases for some weapons systems have been staggering. For example, the unit costs of the Army's new M-1 tank and fighting vehicle have climbed by 76 percent and 49 percent, respectively, over the last year, even after factoring out the amount of inflation anticipated last year. The unit cost of the Navy's new F/A-18 fighter aircraft has grown by 43 percent. Even some mature systems, such as the Air Force's F-15 fighter, have increased 5 percent in unit cost.

Many factors have contributed to this cost growth. Some stem from the Defense Department's choice of complex, sophisticated weapons whose proper functioning sometimes requires numerous design changes after production has begun. The desire to get started on important weapons programs may also lead contractors to make unrealistically low bids to get a program underway, anticipating raising prices once the program is initiated. Budgeting procedures may also lead to unrealistically low estimates of future cost growth. And uneconomical buy rates, along with widely varying annual procurement rates, can also contribute to price increases.

Broadly construed, a discussion of defense acquisition procedures could cover all of these topics. But I will focus this morning on five problems in the way the Defense Department budgets and contracts for weapons.

I should note, Mr. Chairman, that CBO has not worked extensively with the laws and regulations governing defense acquisition procedures. Therefore, my suggestions are intended as a springboard for further discussion, rather than as definitive solutions.

PROBLEM AREAS AND POSSIBLE CONGRESSIONAL ACTION

Encourage Better Planning for Inflation.—In recent years, the Department of Defense has often not budgeted enough money for inflation. As a result, it has needed supplemental appropriations to maintain its planned buys. When these supplementals could not be obtained, the size of the buy frequently had to be sharply reduced. Such reductions led to uneconomical buy sizes and to the instability that the department has identified as a key problem in the acquisition process.

In part, the underestimates of inflation reflect overly optimistic forecasts of the GNP deflator. In addition, the mix of goods priced by the GNP deflator differs from the mix in DoD investment accounts. For example, defense investment includes more high-technology equipment and critical materials, whose prices may have increased faster than the average in recent years. And defense has less access to imports, which can sometimes hold down costs.

There is no obvious alternative to the overly optimistic forecasts of future inflation often made by the Executive Branch. Consulting a variety of forecasters may be a hedge. But most forecasts—including CBO's—have understated inflation in recent years, though usually by less than those of the Executive Branch.

The Congress could encourage—or even direct—that the Department of Defense use specialized deflators that more accurately reflect the mix of goods it purchases.

CBO and others have developed such deflators, and they are available to the department.

Better estimates of inflation could sharply increase the projections of dollars needed to pay for defense purchases of weapons and services. If the Administration's planned purchases as of the mid-session review were reestimated using CBO's deflators, defense budget authority would be higher by $4 billion in 1982 and by a total of $81 billion over the next five years. (CBO has not recosted the Administration's October plans; the added costs might be lower.) These estimates reflect both CBO's higher GNP deflator and the use of specialized defense deflators. Deflators have an important effect on the defense budget because weapons are often built over a period of many years. Budget authority for such weapons reflects projected price growth over the entire period.

The Administration is reluctant to adopt special defense inflators because it believes that use of the overall GNP deflator—which has recently increased more slowly than specialized deflators—puts pressure on the Department of Defense to hold down costs. I can understand the need to avoid high deflators that can become self-fulfilling prophecies. But it still may be desirable to develop defense deflators that reflect the actual mix of defense purchases, lest we foster other problems such as cost overruns.

Improve Congressional Oversight of Weapons Cost Increases.—Underestimates of inflation are, of course, only one reason for the growth in weapons prices. I noted others earlier, including unrealistically low initial cost estimates and design changes. At its heart, the problem of cost growth is one of incentives. Officials at the Department of Defense want to keep initial costs low in order to increase chances of funding for research or production of weapons they feel are crucial to national security. Moreover, in the past at least, DoD officials may have been rewarded more for the quality and timeliness of weapons than for staying within initial cost estimates. Defense contractors are also interested in keeping initial cost estimates low to get research or production started, since continued contracts are then much more likely. These incentives can combine to yield underestimates of weapons costs and subsequent cost growth.

The Congress cannot solve this problem alone; indeed, the Department of Defense should take the lead in providing needed management. But the Congress may be able to help through closer scrutiny of prices; such scrutiny may change the incentives that lead to underestimates.

One approach is included in the Senate's defense authorization bill. That bill would require DoD to report to the Congress whenever the program unit cost of a weapons system—as reflected in the Selected Acquisition Reports, or SARs—increases by more than 10 percent for systems in production or 15 percent for systems in research and development. Such a report should help focus the attention of the Department of Defense on weapons costs.

Important as they are, the Seclected Acquisition Reports may come too late to allow the Congress to consider alternatives to weapons systems that have grown sharply in cost. The Congress could seek earlier warning, perhaps by requiring that DoD include in the SARs some of the cost and performance data now submitted to the department by defense contactors. These data, which are currently not made available to the Congress, compare money spent with the amount of work completed. If the proportion of money spent greatly exceeds that of the work completed, the data suggest a potential cost overrun. Early warning of such overruns could trigger timely Congressional debate over whether the weapon is needed even at higher cost, or whether alternatives should be pursued.

I am keenly aware that the Congress must weigh the value of additional reporting against the danger of excessive Congressional oversight, which could itself increase costs or stifle the needed flow of information to the department. One solution may be to limit any reporting to Congress—particularly transmission of contractor data—to the major SAR systems whose reported cost and performance data exceed a threshold that suggests large potential cost overruns. This should ensure that only the most critical problems come to the attention of the Congress, while increasing the incentives of the department to scrutinize all programs for potential cost problems.

Encourage Competition in Defense Industries Through Second Sourcing.—Economists have long argued that increased competition can hold down prices. Many factors could enhance competition in defense, such as emphasis on competitive contracts where feasible. Let me discuss one other strategy—namely, "second sourcing," or the use of more than one contractor to manufacture a particular weapon.

Second sourcing may sometimes reduce costs. It is difficlult to say by how much, since one must compare actual costs under second sourcing with an estimate of the costs had only one manufacturer been used. Nonetheless, studies by Dr. Gansler, one of your subsequent witnesses, suggest that cost savings of 30 percent can sometimes be achieved. Such savings would be most likely if the second sourcing began at the development stage, when competition can lead to a less costly design, and continued through production.

Second sourcing is not the solution for all weapons systems. Buy sizes must be large in order to make a second producer feasible. Also, the Administration and the Congress must be willing to bear the "up-front" costs of qualifying a new contractor, such as the costs of writing an extensive technical description of the system. And, of course, the potential savings must justify these up-front costs.

Where warranted, the Congress could encourage second sourcing in two ways. First, it could insist that the Defense Department consider second sourcing whenever it formulates a procurement strategy. Second, the Congress might amend current law to encourage second sourcing where it might promote competiton and so cut costs. Current law encurages second sourcing only when it will improve the department's ability to produce weapons quickly during a wartime mobilization.

Encourage Economical Buy Sizes.— The size of a buy is very important to costs. If contractors build facilities capable of producing at a certain rate and then produce fewer weapons, the fixed overhead results in higher unit prices. The 1982 buy of A-10 aircraft is a good example. Last March the Administration proposed to buy 60 A-10 aircraft at $9 million apiece. Recent revisions call for procurement of 20 A-10s at $13 million apiece.

Because of the importance of economical buy sizes, the Congress might require a short report specifying the economical buy size for existing systems and the planned rate for proposed buys. To limit paperwork, such a report could cover only major systems. Where proposed buys deviate from the economical rate, the report should note the reason and the unit cost at the economical buy level. Such a report would focus the department's attention on this important topic and allow the Congress to assess fully the costs of departures from economical buy rates.

Economical buy rates demand more, however, than just managerial attention; they also require political courage. The Administration and the Congress must be willing to terminate a few programs in times of cutbacks, rather than stretching out a large number. During its recent reduction in the defense budget, this Administration did terminate the KC-10 tanker aircraft program and the Army's Roland air defense program. But other buys, such as the A-10 program, were stretched out.

Foster Multiyear Procurement.—Multiyear procurement constitutes one of the Administration's major initiaties in the defense acquisition area. Multiyear contracts, which provide for buys over several years with substantial cancellation charges if the buys are not executed, could offer important benefits. They might encourage cheaper bulk buys of parts, foster a stable work force, and facilitate stockpiling of materials needed to avoid production delays.

Such benefits might cut costs. But I would urge caution in assessing potential cost savings. Early estimates overstated the potential savings from multiyear contracting. Congressional debate last year suggested, for example, that reductions of as much as 30 percent were possible for the Air Force's F-16 aircraft. But much of these savings would have stemmed from quicker buys and the resulting reductions in inflation, rather than from mulityear procurement. Savings from multiyear procurement itself would more often range from 5 percent to 10 percent. Even these estimates should be scrutinized to be sure that the savings do not simply result from more rapid progress payments to contractors, rather than from multiyear contracting.

Despite this caveat, the potential benefits of multiyear contracting certainly merit trying the procedure. The Congress seems likely to facilitate such experimentation by raising the amount that can be paid to a contractor if a multiyear contract is abrogated and by other revisions in the law. Indeed, multiyear procurement might allow the Department of Defense to take advantage of slack market conditions to obtain more favorable prices for weapons. For example, much of the U.S. shipbuilding industry—particularly the yards that could build support vessels or small combatants for the Navy—badly needs business right now. These yards might be willing to enter into multiyear contracts, at very favorable prices, if such contracts would provide some business now.

BUDGETARY SAVINGS DIFFICULT TO ESTIMATE

The options I have just discussed could eventually reduce costs substantially, but it is difficult to say by how much. Potential savings depend on the pecularities of individual weapons. The estimates of savings must be provided by the Department of Defense and its contractors, and these numbers are only now becoming available. Even when some DoD estimates are available, it will not be clear which systems would qualify for revised procedures until the department has time to conduct a review of all candidate systems. Thus, the extent of potential total savings is difficult to estimate at this time.

If the Congress wishes to reduce the costs of defense, it should look beyond the ways the department budgets and contracts for weapons. The Congress should also focus on alternative ways of accomplishing defense missions, especially those in which costs have grown sharply. This consideration has led some to question the role of large ships in the Navy, the M-1 tank and fighting vehicle system in the Army, and the F/A-18 aircraft, among others. The Congress might also question whether U.S. defense priorities would permit less emphasis on certain missions, perhaps those directed at NATO or strategic defense. These are contentious topics that are beyond the scope of my testimony today, but they crucially affect defense costs.

The United States is embarked on a substantial buildup of defense. During that buildup, the public must have confidence that defense dollars are being spent wisely. Such confidence is not strong today, but reviews and cooperative action by the Congress and the Administration could help restore it. I hope that the points I have raised this morning will be helpful in focusing this Committee's review.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

Question 1. In your opinion, what are the principal factors that tend to drive costs upwards in DOD acquisitions?

Answer. The following four factors likely account for a large share of the cost overruns in DOD acquisitions: excessively optimistic initial estimates of costs and performance of systems; uneconomical buys; limited competition beyond the design stage; and optimistic estimates of costs of adding capability to existing systems. These four factors certainly interact in contributing to cost overruns. For example, unrealistic intial cost estimates cause DOD to sponsor too many systems. This leads to uneconomical buys and stretchouts that in turn undermine the chances for awarding production contracts competitively.

Question 2. Every time OMB changes its inflation-rate projections, weapons acquisition cost estimates change. How often does OMB change its inflation rate projections? Generally by how much?

Answer. OMB's primary inflation-rate projections, are those that the Administration develops each year in January as an essential element of its economic forecast and budget projections. Those inflation-rate projections change as events cause the Administration to change its economic forecast. They are typically revised during the mid-session review in the summer.

All forecasts involve uncertainty; but good forecasts should be unbiased, which means they should not generally underestimate or overestimate. In recent years, the OMB inflation-rate projections have consistently underestimated inflation, because successive administrations have failed to foresee many of the factors that have contributed to higher prices. The amount of the change between projections varies widely with shifts in expectations about the economy. For example, the Carter administration's January 1981 budget showed the GNP deflator increasing by 45 percent between 1982 and 1986. The Reagan administration's March 1981 budget projected only a 36 percent increase. The changes between the March budget and the mid-season review, however, were very small.

Question 3. The administration has recommended that Congress fully fund its defense requests because it [full funding] improves the stability of weapons programs, which, in turn, minimizes cost increases. Do you feel that this blank-check funding will destroy any incentive for internal cost-savings, like prioritizing some weapons over others, and therefore lessen Congressional input into defense budgetary formulations?

Answer. I do not think that the Congress should fully fund the administration's defense requests just to improve the stability of the weapons buys. While stability of buys should be a factor, the fundamental concern should be whether the administration has proposed funding for weapons that will accomplish the defense goals supported by the Congress. If, after reaching this judgement, the Congress decides that reductions in defense funding must be made, then those reductions should be made considering stability of weapons buys. This may mean terminating a few programs rather than cutting many programs below their economical buy rates.

Question 4. Without Congress abdicating its budgetary responsibilities, what can be done to inject more certainty in funding levels? Should the Defense Department submit two figures for each weapons category, one reflecting a minimum level of sustenance and another that reflects an increase in capability, but is more or less optional?

Answer. I think it unlikely that the administration, which is out to persuade the Congress to approve its budget, will formally submit alternative levels of funding for various weapons categories. The Congress, however, can and does identify alternatives through informal sources in the administration and through the efforts of its staff and support agencies. It is through debate over these alternatives that the Congress has an important effect on the defense budget.

Question 5. In defense procurement, there is customarily a fierce rivalry during initial competition for an award of a research and development contract. After this initial competition, frequently based on low-cost estimates from interested firms trying to "buy-in", the winner becomes the sole developer and producer for the particular weapons system over the next 20 years. Why should this be so? Why can't more competition be introduced in the awarding of production contracts as well?

For example, the contract for the B1 bomber is estimated at $30 billion over the next 10 years. This money is assured to go to *one* contractor. What is his incentive to keep costs down? The same is true for the MX missile costing many billions more.

Answer. Competition for award of a research and development contract yields visible benefits to DOD (choice among many proposals) but involves only very indirect costs (duplication of research efforts by several contractors that may ultimately contribute to higher costs of items purchased by DOD). Competition during the production phase, however, often involves highly visible costs to DOD (duplication of contractor overhead, dilution of learning-curve effects) but only highly conjectural benefits (greater cost control by producers than would have occurred if the contract had been awarded to a single source). Production competition does not pay in every case, and even when it does, this may be impossible to verify. For all of these reasons, DOD is naturally more reluctant to solicit competition in production than in initial design. This does not mean that more competition in production is impossible. There is no obvious reason why DOD would not solicit more competition in production if the Congress convinced DOD's leaders that they should be willing to risk it in more cases in which savings appeared likely but were not readily documentable.

It is unlikely that competition during the production phase of the B1 would save money, because of the extremely high overhead costs, the high costs of qualifying a second prime contractor, and the small number of units to be procured. It nonetheless is possible, through an appropriately designed contract, to create incentives for cost containment.

Question 6. Without competition in the acquisition of major weapons, the sole producer increases the price of his weapon with few restrictions. The government often has little choice but to attempt to "negotiate" and basically accept the cost increases. Doesn't the use of sole-source procurement lock the government to a cycle of cost increases in major weapons buys from which there is little chance for escape?

Answer. In acquiring a weapons system from a single source, DOD clearly has narrowed its options and therefore should award sole-source contracts only when it is apparent that this saves money. In addition, sole-source contracts can be written in such a way as to provide the government with some protection against cost increases. For example, the contract could be fixed price if the weapons system is not likely to change. Also, a sole-source contract can specify (and often does) that the government pay only a predetermined fraction of those cost increases that are outside the control of the producer. Such clauses create incentives for sole-source producers to minimize costs. If cost growth is exceptionally high, however, and truly outside the control of the producer, then much higher prices are inevitable. In such cases, DOD may choose to stop procurement of an item and start to pursue alternatives. This option may not be attractive, but it may be unavoidable given the element of uncertainty in projections of weapons costs.

Question 7. Why doesn't the Defense Department use competition in awarding contracts more often? What is it, in your opinion, that prevents the DOD from using competition? Is there an institutional bias against using competed contracts on the part of DOD?

Answer. As I noted above, there are costs involved in having more than one producer. Costs include those to qualify a second contractor, duplication of contractor overhead, and dilution of learning-curve effect. Thus at times it may not save money to have two producers. There may also be less acceptable reasons why the Department would not want more than one contractor. For example, the extra contractors add to the paperwork and administrative efforts necessary to get the project underway.

CONGRESSIONAL BUDGET OFFICE
U.S. CONGRESS
WASHINGTON, D.C. 20515

Alice M. Rivlin
Director

November 6, 1981

Senator William Proxmire
Ranking Minority Member
Senate Appropriations Committee
Room 5241
Dirkson Senate Office Building

Dear Senator Proxmire:

In response to your request the Congressional Budget Office (CBO) has reviewed the investment (procurement and research development) costs of the B-1 bomber and assessed the impact of potential inflation on the program. Our estimate includes the total acquisition costs of the baseline bomber; the four major additional items that the Air Force has requested the contractor to examine; and, as you requested, the items GAO has indicated should also be included in the cost of the B-1.

The baseline costs of the 100 bomber program as provided by the Air Force are, $19.7 billion (in constant 1981 dollars). In addition, the Air Force requested the prime contractor to examine four major items that may be included in the final contract. These four items are rear bomb bay enlargement, permissive action link/command disable system, air-launch cruise missile (ALCM) carriage, and ALCM avionics. The Air Force estimates that these additions to the program would cost $1 billion (in constant 1981 dollars).

As you requested, we have also analyzed the major investment items that the General Accounting Office (GAO) has indicated should be included in any cost estimates of the B-1. The GAO identified these items under three broad classifications: (a) questionable reductions, (b) expenses in other program elements, and (c) potential additions. These items are shown in Attachment 1. The identified cost for all GAO items is $5.5 billion (in constant 1981 dollars). For several of these items, including operational and electromagnetic pulse testing, conventional weapons certification, a fuel tank inerting system, low and very low frequency communications, and improvements to offensive and defensive systems—the GAO was unable to obtain basic cost estimates. We have therefore, not included estimates for these items in this assesament. Also, in estimating contractor support and nuclear weapons certification, the GAO anticipated a range of $1 billion to $2.8 billion; in this assessment we have used the mid-point of the GAC range for these two items.

After applying CBO's inflation rate assumptions to the full range of program costs discussed above, we estimate that B-1 investment costs will be $39.8 billion in then-year, or budget, dollars. With the Administration's inflation rate assumptions, the comparable cost would be $35.4 billion.

Attachments 2 through 5 provide year-by-year estimates of budget authority, using both CBO and Administration economic assumptions, for the baseline bomber (Attachment 2), the four options for which the Air Force requested contractor proposals (Attachment 3), the various items the GAO has indicated as being appropriate for any B-1 cost estimate (Attachment 4), and a summary of the total program costs (Attachment 5). Attachment 6 provides a year-by-year comparison of estimated budget authority and outlays for the total program.

These estimates, it should be noted, are for investment costs only; they are not life-cycle costs. They do not reflect the costs of operating the B-1 once it is in the Air Force inventory. Nor do they reflect the possible costs of other weapon systems to enhance the capability of the B-1 such as a new short range attack missile or a new tanker for aerial refueling.

I am sending an identical letter to Senator Leahy and a copy to Chairman Hatfield. If your staff should have any questions concerning these estimates or the attachments they can contact Mr. Patrick Renehan of our Defense Cost Unit at 226-2840.

Sincerely,

Alice M. Rivlin
Director

cc: Senator Mark O. Hatfield
Chairman
Senate Appropriations Committee

ATTACHMENT I: ADDITIONAL ITEMS IDENTIFIED BY GAO (In millions of constant 1981 dollars)

SUBJECT	COST
Questionable Reductions:	
Engineering change order budget	440
Change in avionics learning curve	100
Change in airframe learning curve	500
Reduction in avionics production estimate	86
Consideration for multiyear procurement	800
Transfer of engine component engineering development to component improvement account	40
Deferral of air vehicle depot support development	300
Expenses in other program elements:	
Operational test and evaluation	No Estimate
Engine component improvement program	115
Conventional weapons certification	No Estimate
Interim contractor support	500-2,000
Production facilities improvement	71
Manufacturing technology enhancement	170
Base facility improvement	173
Nuclear weapons certification	500-750
Potential Additions:	
Second inertial navigation system	220
Forward looking infrared sensor	125
Simulator development and procurement	337
Full scale fuselage fatigue testing	140
Fuel tank inerting system	No Estimate
Electro-magnetic pulse testing	No Estimate
Low frequency/very low frequency communications	No Estimate
Hardware, testing, electronics and support for additional weapons	No Estimate
Future improvements to avionics	No Estimate

ATTACHMENT 2. COMPARISON OF ADMINISTRATION AND CBO BASELINE B-1 COSTS (Budget authority by fiscal year, in millions of dollars)

	1981	1982	1983	1984	1985	1986	TOTAL a/
Development							
Constant 1981 dollars	210	670	620	460	430	40	2,430
Administration then-year dollars	218	750	741	583	573	56	2,921
CBO then-year dollars	218	762	761	608	609	61	3,017
Procurement b/							
Constant 1981 dollars	0	1,300	2,580	4,370	4,800	4,240	17,290
Administration then-year dollars	0	1,565	3,290	5,860	6,744	6,229	23,688
CBO then-year dollars	0	1,639	3,544	6,524	7,777	7,454	26,937
Total a/							
Constant 1981 dollars	210	1,970	3,200	4,830	5,230	4,280	19,720
Administration then-year dollars	218	2,316	4,030	6,443	7,317	6,285	26,609
CBO then-year dollars	218	2,401	4,305	7,131	8,386	7,514	29,955

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a/ Numbers may not add to totals because of rounding.

b/ These procurement funds support a buy of 2 aircraft in 1982, 7 in 1983, 9 in 1984, 36 in 1985 and 46 in 1986.

ATTACHMENT 3. COMPARISON OF ADMINISTRATION AND CBO B-1 OPTION COSTS (Budget authority by fiscal year, in millions of dollars)

	1981	1982	1983	1984	1985	1986	Total a/
Rear Bay Enlargement							
Constant 1981 dollars	0	53	68	39	11	[illegible]	173
Administration then-year dollars	0	60	84	51	15	5	215
CBO then-year dollars	0	61	89	57	17	6	230
Permissive Action Link/Command Disable System							
Constant 1981 dollars	0	39	33	15	46	54	187
Administration then-year dollars	0	45	41	20	65	79	249
CBO then-year dollars	0	46	43	22	75	95	281
ALCM Carriage:							
Constant 1981 dollars	0	130	261	182	51	16	640
Administration then-year dollars	0	149	329	244	72	23	816
CBO then-year dollars	0	153	351	270	82	28	885
ALCM Avionics							
Constant 1981 dollars	0	6	10	8	2	1	26
Administration then-year dollars	0	6	13	10	3	1	32
CBO then-year dollars	0	7	14	11	3	1	35
Total a/							
Constant 1981 dollars	0	228	372	243	110	74	1,026
Administration then-year dollars	0	260	466	325	154	109	1,313
CBO then-year dollars	0	266	497	361	177	130	1,430

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a/ Numbers may not add to totals because of rounding.

ATTACHMENT 4. COMPARISON OF GAO IDENTIFIED COSTS (Budget Authority by fiscal year, in millions of dollars)

	1981	1982	1983	1984	1985	1986	Total a/
Questionable Reductions							
Constant 1981 dollars	0	245	395	576	585	465	2,266
Administration then-year dollars	0	287	496	767	817	683	3,050
CBO then-year dollars	0	297	529	846	935	817	3,423
Expenses in Other Program Elements							
Constant 1981 dollars	17	106	101	163	942	1,074	2,403
Administration then-year dollars	19	128	128	219	1,308	1,549	3,351
CBO then-year dollars	19	134	138	244	1,481	1,790	3,806
Potential Additions							
Constant 1981 dollars	0	109	153	198	206	156	822
Administration then-year dollars	0	126	191	263	287	229	1,096
CBO then-year dollars	0	130	203	289	328	274	1,223
Total a/							
Constant 1981 dollars	17	460	649	937	1,733	1,695	5,491
Administration then-year dollars	19	541	816	1,248	2,412	2,461	7,497
CBO then-year dollars	19	560	870	1,379	2,743	2,880	8,452

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a/ Numbers may not add to totals because of rounding.

ATTACHMENT 5: COMPARISON OF TOTAL B-1 ACQUISITION COSTS (Budget authority by fiscal year, in millions of dollars)

	1981	1982	1983	1984	1985	1986	TOTAL a/
Baseline B-1							
Constant 1981 dollars	210	1,970	3,200	4,830	5,230	4,280	19,720
Administration then-year dollars	218	2,316	4,030	6,443	7,317	6,285	26,609
CBO then-year dollars	218	2,401	4,305	7,131	8,386	7,514	29,955
Four Options							
Constant 1981 dollars	0	228	372	243	110	74	1,026
Administration then-year dollars	0	260	466	325	154	109	1,313
CBO then-year dollars	0	266	497	361	177	130	1,430
GAO							
Constant 1981 dollars	17	460	649	937	1,733	1,695	5,491
Administration then-year dollars	19	541	816	1,248	2,412	2,461	7,497
CBO then-year dollars	19	560	870	1,379	2,743	2,880	8,452
Total a/							
Constant 1981 dollars	227	2,658	4,220	6,010	7,073	6,049	26,237
Administration then-year dollars	237	3,116	5,312	8,016	9,883	8,854	35,419
CBO then-year dollars	237	3,228	5,672	8,870	11,306	10,524	39,837

a/ Numbers may not add to totals because of rounding.

ATTACHMENT 6. COMPARISON OF TOTAL B-1 ACQUISITION COSTS (Budget authority and Outlays by fiscal year, in millions of dollars)

	1981		1982		1983		1984		1985		1986		TOTAL	
	BA	O	BA	O	BA	O	BA	O	BA	O	BA	O	BA	O
Constant 81 dollars	227	128	2,658	840	4,220	1,925	6,010	3,319	7,073	5,057	6,049	6,141	26,237	17,410
Administration then year dollars	237	133	3,116	950	5,312	2,309	8,016	4,191	9,884	6,699	8,854	8,472	35,419	22,754
CBO then year dollars	237	133	3,228	970	5,672	2,407	8,870	4,485	11,306	7,374	10,524	9,610	39,837	24,979

Review of 30 June 1981 Selected Acquisition Reports (SAR)

Weapons System	Reported Unit Price Change	Apparent Computation Errors in the Application of Stated Inflation Rates	Indication that Future Costs May Have to be Adjusted
			Army SAR Programs
Patriot	No change reported	-----	Contractor estimated costs to complete initial production contract reflects an increase of $111.4 million (42.9%) during quarter, although total program costs are unchanged. If initial production contract costs estimates are too low, then production costs estimates for subsequent years may reflect a similar bias.
AH64	No significant change reported.	Inflation after 1982 underestimated by $165 million	Estimates of completion cost of major development contract show increases in reporting period (at least partially the result of crash of prototype) while SAR costs for development remain unchanged.
UH60	No significant change reported	Inflation after 1982 underestimated by $192 million	-----
CH47D	No Significant change reported.	Inflation after 1982 underestimated by $112 million	Pending Program Objectives Memo proposal to speedup production (and end program in 1990 vice 1994) should reduce unit costs if approved by the Administration.

Copperhead	No change Reported	-----	Current SAR reports that Initial Deliveries and Production Validation Test milestones have each slipped 3 months. SAR also reports that IOC milestone previously reported cannot be met and a new IOC is yet to be determined. SAR states that the cost impact of all of these slippages was reported in the previous SAR report. A reestimate of the costs of the FY 1980 program indicates that cost to complete contract exceeds available funds by $20 million. FY 1980 deliverable projectiles are being reduced by 1025 and materials shifted to FY 1981 for assembly. However no cost impact of this change is reported in this or previous SAR.
DIVAD Gun	No change reported	Inflation after 1982 underestimated by $32 million	Delay in source selection resulted in slippage of all milestones from ASARC/DSARC III to IOC by one month. However both total and annual cost estimates remain unchanged.
Fighting Vehicle	No significant change reported	Inflation after 1982 overestimated by $11 million However there is further evidence that inflation may be overestimated by more than two billion dollars due to use of inflation factors higher than those stated in the SAR and approved by OMB.	Although a second production source for the vehicle is planned, funding does not reflect the costs associated with the requirement. A 2½ month strike occurred at the plant of the Prime Contractor during the reporting period, however the cost impact is not reflected in the SAR covering the reporting period.
M I TANK	No change reported	Inflation after 1982 underestimated by $299 million. Inflation from 1972 to 1982 is reportedly 7% per year higher (a total of 72%) than other comparable weapons programs.	Contractor estimate of costs to complete second year production contract reflects a substancial increase during quarter. This suggests that production costs for future years may also reflect similar increase.

MLRS	No change Reported	-----	A 2½ month strike occured at the vehicle contractor plant during the reporting period. Reported costs do not reflect impact of this event.
Hellfire	No change reported	Inflation after 1982 overestimated by $24 million	During the reporting period, slippages of Prototype System Qualification Test (2 months), Award of first Production Contract (1 month) and Production Validation test (3 months) occured. Four modifications to the development contract increased the contractor's estimate to complete by $9.8 million.
Pershing II	No change reported	-----	The current SAR reflects estimates lowerthancurrentestimates.TheSARstatesthattheProgramManageris attemptingtolowerthecurrentlyestimatedcoststothelevelpresented in the SAR. Also the SAR reports that the Pershing II has already experienc inflation significantly greater than contained in OSD guidance.
Roland	No change reported	Inflation after 1982 underestimated by $24 million	-----
SOTAS	No significant change reported	Inflation after 1982 underestimated by $13 million	This system as a result of greater than anticipated technical and managerial complexity was recently restructured causing a slippage in the production contract award date. Subsequently an updated cost estimate was prepared in March 1981 but never incorporated in the current SAR. This updated cost estimate apparently reflects substantial cost increases. On 22 July, 1981, OSD directed that the Army submit within 60 days revised program options including reduction of acquisition cost of a restricted program. A stop work order was issued to Motorola (the principal development contractor) on 23 July, 1981. Notwithstanding these developments, the 30 June SAR reflects virtually no cost changes from the 31 March SAR.

Navy SAR Programs

CVN 68 Class	No change reported	-----	Since $658 million in long lead funds were included in the March 1981 Budget for an additional ship of this class, the SAR should reflect the cost of this additional vessel. Costs of total program appear to be understated by approximately $2.5 billion.
SSN688	No significant change reported	Inflation after 1982 overestimated by $479 million	During the reporting period, a prime contractor (EB) revised the delivery schedule for 9 submarines. The extended deliveries ranged from 4½ to 16 months. Such slippages may result in increased real costs and will certainly result in increased nominal cost due to the longer period of exposure to the impact of inflation. Notwithstanding these slippages, total costs for that program increase only a very nominal amount due to causes apparently unrelated to the slippages.
Guided Missile frigate (FFG-7)	No significant change reported	Inflation after 1982 overestimated by $86 million	Funding shortfalls exist for the procurement of Lamps MKIII equipment for FY 1979 and FY 1981 program year ships.
NATO PHM	Reported Procurement unit price increases 2.5% and program unit price increases by 2.0%.	-----	-----
F14A	Reported procurement unit price increase 1.6% and program price increases 1.0%.	-----	While holding total costs relatively constant, SAR reports that inflation increased by $303.4 million and real costs were reduced by $140.3 million. This increase in inflation is reported in spite of the fact that inflation rates were lowered in Mar 1981 and have not changed since then. The only explanation for this reduction in real costs is recomputation of escalation.

P3C	No significant change reported	Inflation afer 1982 underestimated by $17 million	SAR indicates that this is the last report for the weapons system although $5 billion of costs are yet to be expended and $4.8 billion in costs are yet to be appropriated. Unit prices for this system in the past 9 months has increased 25.7% for procurement and 23.7% for program. Considering the size of the remaining program and recent cost performance of program indicates that continued visability of costs through SAR process may be desireable.
AV8B	First SAR Report for this system.	Inflation after 1982 underestimated by $23 million	-----
E2C	No significant change reported	-----	SAR indicates that this is the last report from this weapons system although cost to complete is $1.6 billion and $1.4 billion is yet to be appropriated. Unit prices for this past 9 months have increased 7.4% for procurement and 6.8% for total program. Considering the size of the remaining program and the program's recent cost history, continued SAR reporting may be appropriate.
F/A-18	No change reported	Inflation after 1982 underestimated by $678 million	During this quarter, the cost estimate for a major contract reflected an increase of $47.6 million (+9.5%) although overall reported program costs remain unchanged. The cost increase associated with this early production contract may extend to future years, thus producing a greater impact than that associated with just the contract reestimate.
Phoenix	No significant change reported	Inflation after 1982 underestimated by $109 million	SAR reflects an increase of $197.7 million in escalation due to OMB escalation rate. The increase in escalation is inconsistent with changes that have taken place in escalation rates. The last change that has taken place in escalation rates was in March 1981 when the escalation rates were reduced - not increased.

Sparrow III (Navy)	Reported unit prices increase by 0.7%	Inflation after 1982 underestimated by $6 million	As a result of higher than projected labor and material inflation and slippage in the program, the 1981 and 1983 program costs exceed those shown in the SAR. The increased impact in 1984 and beyond is being evaluated. The impact in 1982 was offset by an increase in the Budget Ammendment of March 1981.
Lamps MK III	No changes reported.	Inflation after 1982 underestimated by $27 million	SAR Reports that certain GFE costs have increased substantially. Additional cost increases are anticipated as a result of having to develop a second source for certain equipment. As a result of an earlier cost assessment and recent contractor proposals, a detailed priceout of the program is currently underway. Also, additional million costs for trainer facilities are not included in SAR estimates.
Captor	No changes reported	Inflation after 1982 overestimated by $18 million	-----
Harm (Navy)	No changes reported	Inflation after 1982 underestimated by $11 million	An effort is underway to qualify a second source producer of the missile. However, the SAR does not include $95 million required to complete this effort.
Harpoon	No changes reported	SAR shows more escalation dollars in the FY 1984 and FY 1985 program than total dollars for the same years. Program is thus underfunded by at least $34 million.	-----
Sidewinder (Navy)	No changes reported	-----	SAR reports that there are insufficient funds in FY 1982 to support programmed buy of 910. Program is underfunded by $12 million.

Tomahawk	Unit costs decline by less than 0.2%	Inflation after 1982 underestimated by $14 million	A cost reduction is achieved by reducing initial spares in prior years. This suggests that necessary initial spares are being reduced to save dollars. Contractor estimates for completion cost of several development contracts reflect substantial increases based upon actual costs to date and estimated costs to complete. Notwithstanding the contractors' unfavorable cost performance variance, the estimate for development costs is unchanged.
Trident Submarine	Procurement unit costs increase by 2.4% and program unit costs increase by 2.3%	Inflation after 1982 overestimated by $640 million	-----
Trident I Missile	No changes reported	Inflation after 1982 underestimated by $123 million	-----
SAL	No change reported	Inflation after 1982 overestimated by $46 million	-----
SURTAS	Procurement unit costs increase 50% and program unit costs increase 46.2%	Inflation after 1982 underestimated by $6 million.	SAR reports that OSD approved a change in the array aperture that would reduce acquisition costs for the system. However, this reduction is not reflected in SAR. In order to hold total program costs at approximately the same level, the number of units to be acquired has been reduced by 33%.
TACTAS	Unit prices reflect a 0.1% reduction in procurement and 0.3% program costs.	-----	Revised milestone schedule reflects slippages of 3 to 9 months for most major milestones including first production delivery and IOC. The cost impact of these unfavorable changes is not reflected in the current SAR for total program costs or annual program costs.
CG47	No significant changes reported	Inflation after 1982 overestimated by $304 million	-----

Air Force SAR Programs

A-10	No significant Changes Reported	-----	-----
F-15	No changes reported	Inflation after 1982 underestimated by $21 million	Cost of marginal aircraft added to FY 79-81 airframe contract are 20% higher than base contracts. It is possible that estimates of future airframe costs (FY 1982-1983) may require corresponding upward adjustments.
F-16	No significant changes reported	Inflation after 1982 underestimated by $380 million.	-----
E3A	No significant changes reported	-----	-----
E-4	No changes reported.	-----	-----
EF-111A	No changes reported	-----	Completion of milestones for phase 1B is reportedly delayed by six months, although no dollar changes in program are reported.
PLSS	No changes reported	-----	Cost estimates for this system include development costs only. To the extent that operational systems are procured, this system cost is understated. Presumably DOD is pursuing this development program with an intention to procure operational systems.
Maverick IR	No changes reported	Inflation after 1982 underestimated by $45 million	Hardware delivery delays and the inability to complete winter site testing precludes completion of IOT & E milestone. Revised plan and schedule are under review. Cost impact of this slippage not reflected in SAR.

DSCS III	No changes reported.	-----	Estimate of cost for Development contract is increased, but increase is not reflected in total development cost. SAR reports a termination of current efforts to launch DSCS satellites and to implement a "call up strategy". As a result, first demonstration flight satellite launch which was scheduled for June 1981 is now on a "when directed" basis. The scheduled date for the second demonstration flight satellite launch availability is slipped two months and first production satellite delivery is slipped five months. Notwithstanding these changes, total and annual costs for the program are unchanged.
Navstar:	No changes reported	Inflation after 1982 underestimated by $12 million	Contractor estimates to complete a major development contract reflect a 53% on $87.9 million increase. Notwithstanding this increase and other contract estimate increases, total costs for the program are unchanged.
ALCM:	No significant changes reported	Inflation after 1982 underestimated by $34 million	Contractor estimate of cost to complete a development and an initial procurement contract reflect substantial increases. The cost increases in the initial procurement contract suggest that estimates for the entire procurement program may be too low. Total program cost estimates reflect only very nominal changes.
GLCM	Procurement costs are unchanged and program unit costs increase 0.7% because of% deletion of four development missiles.	Inflation after 1982 underestimated by $21 million	Contractor estimates for nearly all development contracts and the initial procurement contract reflect increases over the quarter. Several of the contracts showing increased cost report reduced level of effort and unfavorable cost performance variance. Notwithstanding these events total program costs are unchanged.

Harm (Air Force)	No change reported	Inflation after 1982 underestimated by $14 million	Although this is part of a joint Navy/Air Force Harm program, the Air Force and Navy procurement program assumptions are inconsistent. The size and phasing of the annual procurement program may have a significant impact on the unit cost.
Sidewinder (Air Force)	No changes reported.	-----	-----
Sparrow III (Air Force)	No changes reported	-----	The current SAR program is short $23.0 million for the proposed 1981 buy. Based upon this increased 1981 cost, it appears that 1982 could be short by $22 million with similar increases necessary from 1983 to 1986.

Chairman ROTH. At this time I would call on Norman Augustine, who is Chairman of the Defense Science Board and vice president of Martin Marietta Aerospace.

Mr. Augustine, we are pleased to have you here today. You have a broad background in this area as we grope for some effective answers to the problem facing us. I would hope you will be able to summarize your statement so that we could use the time to the maximum extent to ask you questions.

TESTIMONY OF NORMAN R. AUGUSTINE, CHAIRMAN, DEFENSE SCIENCE BOARD, AND VICE PRESIDENT, MARTIN MARIETTA CORP.

Mr. AUGUSTINE. Mr. Chairman, members of the committee, among the many weighty matters that come to the attention of your committee, I suspect there are few that have a more fundamental impact on our Nation than the matter of defense acquisition. It is a particular privilege for me to share with you my views on some of the problems and hopefully on some of the solutions to those problems.

I would propose to submit for the record a rather detailed statement I have prepared. It includes a number of specific recommendations you might wish to consider, and to take with the committee's permission perhaps 10 to 15 minutes now to present the first part of it and a summary of the latter part. Will that be acceptable?

Chairman ROTH. That will be very satisfactory.

Mr. AUGUSTINE. Fine.

I should begin by saying that my perspective on these matters is as one who has served in the Office of the Secretary of Defense under such individuals as Secretary McNamara and Deputy Secretary Packard during the years of change that they were introducing. Also as one having formerly served as Under Secretary of the Army and as a vice president of two large industrial firms as well as a board member for a small industrial firm. I also consider myself to at least attempt to be somewhat a student of the acquisition process and have participated in independent activities on behalf of each of the military departments and other organizations such as the Executive Office of the President, NASA, and the General Accounting Office.

I need to say that this diversity of views is in many respects a liability. If one need be concerned with only a single perspective, frankly, it is much easier to find solutions. The difficulty is that, to use the words of H. L. Mencken, for every problem, "there is one solution which is simple, neat and wrong."

Probably no one can speak on behalf of all the above organizations, certainly not I. But I do appreciate your invitation for me to appear before you as an individual, as a citizen, to share my personal views. The views I express most assuredly will not all be shared by my colleagues in industry. Similarly a number of these views undoubtedly will not be shared by my former associates in Government. It is my sincere hope that my comments will be of help to you and the Department of Defense in the matter of improving the acquisition process.

This is a critically important undertaking, and I use the word "critically" advisedly.

I would like to be able to assure you first of all that if the Department of Defense were just managed with perfect efficiency our military concerns would vanish. Unfortunately, this is not the case. As long as we have an intelligent adversary who spends perhaps 70 percent more than we on military forces and perhaps twice as much on acquisition according to the CIA's estimates, there is obviously no degree of efficiency in our acquisition process that will redress that problem. The answer lies only in greater spending and in arms restrictions. But that doesn't set aside the fact that part of the answer does indeed reside in the need to have a more efficient acquisition process. That is what I would like to address in some detail.

To have increased defense spending without an accompanying effort to spend that money more efficiently would be irresponsible. No one could confuse the enormity of the task of managing the acquisition process conducted by the Department of Defense with the challenge of managing more ordinary activities, such as those in industry. First of all, defense research, development and procurement managers alone are responsible for the efficient expenditure of some $300 million a day, an enormous task.

Second, unlike most commercial practices, there is for most of the important defense products, as you have pointed out, but a single buyer and, furthermore, a single seller.

Taken together, these three factors, in my judgment, provide a formula for a unique set of problems. A set of problems which will require for their solution a willingness to accept substantive new approaches in acquisition and not a predisposition to dismiss new ideas simply because they are new ideas or, unfortunately, because some of them may, too, have imperfections. The goal probably will have to be to find a solution with the fewest flaws rather than to seek a perfect solution—which I suspect we will never find.

It is instructive to begin by asking how good or how bad is the defense acquisition process? To assist in that examination, it is appropriate to define the purpose of that process as being one of providing equipment to the military forces when that equipment is needed with the necessary performance capability and at minimum cost. Thus, three fundamental parameters emerge—cost, schedule and performance. Each is exceedingly difficult to assess in an absolute sense. It is, fortunately, easier and still important to address the question of why it is so difficult, seemingly, to produce items of equipment to costs originally estimated on the schedule that was originally prescribed and providing the performance initially intended.

The data I myself have collected over a number of years would indicate that the acquisition process does moderately well in assuring that performance goals are met. About three-fourths of the time these goals are either met or exceeded and in no more than one-tenth of the cases does the process fall short of performance goals by more than 20 percent.

On the other hand, these data I have collected would reveal that scheduled overruns of about one-third occur fully half the time.

The most recalcitrant problem of all, however, is the matter of cost control; which you focused on this morning in your opening remarks. The evidence I have gathered to address this issue has been adjusted in several important matters. First, I included only completed programs because to analyze partially completed programs merely exacerbates the problem of rose colored glasses looking at the future.

Second, I have corrected for changes in procurement quantities. It makes no sense to criticize the procurement process when we decide to buy more or less of an item. That is usually, although not always, a separate decision.

Finally, I have taken out the effect of inflation because it is my belief that it is not proper to hold the officials in any particular department responsible for inflation of the economy as a whole any more than it is possible to commend them when, indeed, inflation rates do drop—and thence consider them very clever managers, indeed. I don't think that is realistic.

Under these circumstances and over a long period of years, the chances of a major program being completed within its initial cost estimate, R. & D. plus procurement, is found to have been about 9 percent. The chances of a program being completed with no more than a 50 percent overrun are no better than 70 percent and the median, as distinguished from the average overrun, is approximately 32 percent. The average overrun under the conditions I described is in fact nearly 52 percent.

Clearly we must do better. Clearly we can do better; and in fact, the trend for each of the past three decades has, as best I can determine, been one of gradual improvement.

One other very important parameter I would call to the committee's attention which all too often is omitted from such analyses, is the matter of reliability. That is seldom considered as a performance parameter, although in my mind it is very important. It does little good to have items which work very well in terms of providing performance when indeed they are functioning, but when they are really needed in combat may not be working at all due to unreliability.

The data that relates to reliability is very sparse and very dangerous. I wouldn't attempt to try to share it with the committee because I could not stand behind what I have.

On the other hand, I have visited forces in the field using equipment that has been developed with our acquisition process and obtained qualitative reactions. I have visited forces ranging from Korea to Berlin, Vietnam to North Africa, the Arctic Circle to Panana.

One thing those people who use what we provide them have in common is a concern over reliability and maintainability.

How have problems been permitted to arise and persist over so many years and who is to blame? Unfortunately, there is enough blame to be shared by us all, certainly by those in industry and certainly by those who serve in the Government, in the administration and Department of Defense; and I would respectfully point to the Congress itself as a cause of a number of problems that plague us.

Rather than to seek to allocate blame, it is probably more rewarding to identify positive solutions. As it happens, I have for some years been keeping an informal list of candidate improvements for the acquisition process, and I would like to share that list of initiatives with you for whatever assistance they might be in your deliberations.

You will recognize in some of them very similar approaches to those embodied in the "Carlucci Initiatives." I find myself in general agreement with most of the initiatives that Secretary Carlucci has proposed. I believe, though, in the case of his initiatives as well as my own, the real problem is that which I can best suggest to you by a quotation from Henry IV. The claim goes as follows: "I can call spirits from the vasty deep." And the answer was, "Why, so can I, or so can any man. But will they come when you do call for them?"

That is indeed the problem. It is easy to identify the symptoms in the acquisition process. It is not too hard to identify the problems. It is quite difficult to identify real solutions, and it is incredibly difficult to make any of it happen.

With this observation in humility, I will move forward to propose my 25 initiatives that might help strengthen the acquisition process. I will just summarize each very quickly and present them in my order of my perceived importance.

The first would be to adopt a new approach for cost estimation, and particularly to include the effect of unknowns and uncertainties and of risks. The cost estimation process today doesn't recognize uncertainties and therein, I think, lies the root of our problems.

Second, I would place much increased emphasis on reliability of the equipment we build.

Senator COHEN. Excuse me. What do you mean by "uncertainties?"

I am uncertain what you mean by "uncertainties."

Mr. AUGUSTINE. Senator Cohen, I am referring to the fact when we make cost estimates, we generally include only those things we know we will have to do in the entire life of the program. We don't include any provision for things that are unexpected such as test failures, for changes in schedule that are caused by funding changes or by test problems, the possibility we may not get parts that are needed on time. All these things you cannot predict in advance, but which invariably occur on a statistical basis.

Senator COHEN. Do you want to put in a 10-percent contingency—go ahead, I will ask you on my time.

Mr. AUGUSTINE. Fine. I will be very happy to talk about that. As I was saying, I would place increased emphasis on reliability and penalizing contractors if they don't produce equipment that meets reliability tests.

I would demand program stability. Program turbulence due to people changes, schedule changes, funding changes and design changes are eating away at the strength of the acquisition process.

I would encourage qualified individuals to enter and stay in the program management process within the Government. The Government today is losing many of its best managers for what I consider to be reasons of false economy, namely placing pay ceilings on people who then leave the Government and make more money elsewhere. We need those key people in the Government.

We need to delegate authority more. The system of managing the acquisition process is just too large and requires too much detailed knowledge to be centralized to too great a degree. On the other hand, policymaking needs to be centralized. Execution, I think, needs to be placed at lower levels.

We need to incentivize realism in the contractor and the Government cost estimating process.

I think we need to use competition to a much greater degree. Here I have to say, though, that there are some cases where competition could be counterproductive, and I will be happy to discuss that.

I think we need to incentivize improvements in productivity. You can do that by coupling profits more closely to capital investments, through tax incentives and through multiyear procurement.

I think we need to provide managers the latitude to manage. Today we ask them to provide a forecast 3 years in advance of how much money will be needed in a program, and then we provide them almost no latitude to make changes to adapt to the things that occur during that 3 years.

I would think in that regard that reprograming thresholds need to be changed. We also need to budget realistically for inflation. That is obvious.

We need to initiate only those programs which can be fully funded. The idea of spreading the available money over all the programs you would like to have is a certain formula for inefficiency. We need to prioritize what we need. Start only those things that are essential; and don't even start the ones we cannot fully fund and produce at a sufficient rate.

We need to discipline the requirement process. The last few percent of capability usually costs the major part of the money and usually causes the major part of the problems. But you have to be very careful to say also, in some cases, it may give you the winning margin in combat. It is a difficult tradeoff.

We need to strengthen the mobilization base in this country, and particularly reduce our vulnerability to the lack of domestic raw materials. We should continue a fly-before-buy policy.

I think we should give increased priority to logistics; spares, trained mechanics, tools and test equipment. There is little advantage to buying twice as many aircraft if half of them have to be on the ground because we didn't buy enough spares.

I think we have to reduce the number of decisionmakers, the number of layers and the amount of paper in the acquisition process.

We need to adopt Preplanned Product Improvement, P^3I, on a much wider basis.

The vendor structure in the defense industry deserves particular attention by your committee. Most hearings such as this focus on the prime contractors. A lot of problems are down in the vendor areas where the small companies are hurting today. They are the ones that deserve much of your focus and much of your help.

I believe we should encourage the introduction of selected new concepts that provide quantum jumps in capability; and short of obtaining a quantum jump of new capability, continue to build and improve the systems we have.

The use of "contracting-out" will offer considerable payoff to the Government if more widely practiced.

Schedules, I believe, should be established with modest concurrency—but only modest concurrency.

International programs are a frequently high cost endeavor. I believe they are best pursued on an industry to industry basis with Government approval rather than the converse.

I believe it is appropriate to adopt a policy of discounting future costs as done throughout the financial world, as I know it, but not by Government.

And, finally, I believe we need to place more emphasis on the design to cost technique for controlling cost of individual items of hardware.

Those are a lot of suggestions. There is more detail in the prepared statement. Making the suggestions is the easy part. Implementing them, I would submit, is a very challenging undertaking. I will be happy to answer any questions the committee might have.

Chairman ROTH. Thank you, Mr. Augustine.

One of your recommendations is more reliance on competition. I think all of us agree that the more you do rely on competition the better the cost figures will be. Is it practical—you probably have heard me ask the question about the B-1. I don't care if it is that or some other weapon. Is it practical to try to develop some competition down the road on these major weapons systems or is that just a phantom issue?

Mr. AUGUSTINE. The programs I have seen that involve competition were by far the best programs from the Government's perspective. From industry's perspective, I think competition brings the best out in people. It is an effective method. I think it should be applied as widely as possible.

Now, let me answer your question "how widely is possible?" For items where there is serial production in large quantities—missiles, some kinds of electronics, fuzes, ordnance, things of that type, you clearly can have competition and should have it. When you have something like the B-1 that you cited, there was, of course, intense competition when the B-1 initially was begun. The problem is today there is not much competition to build a B-1. When you have items you procure in small quantities, such as the B-1 or you have major tooling costs, you have to train a large work force, you have to establish test equipment, you have to establish quality control procedures, you usually cannot amortize the investment cost of setting up a second producer for a program like that.

Now, there is something you can do, though, and it relates to the fact that for most prime contractors, over half of their business is passed on to subcontractors or vendors in the form of procured items. Many of those items are standard items. They are items less complex and require less tooling. I think I can safely say that many of those can be competed.

I believe you can get not all the benefits of competition on a B-1 type program, but you can get many of them by competing at the vendor level.

Chairman ROTH. Let me ask you to explore a little more on the B-1. I would assume that the potential contractor for that is going to have to tool up for that—he must have built prototypes or something at this point?

Mr. AUGUSTINE. I don't know.

Chairman ROTH. From your experience, won't the contractor have to tool up for the 100?

Mr. AUGUSTINE. Yes, he will. He has probably built the ones he has built on soft tooling, so I would assume he would have to tool for serial production.

Chairman ROTH. But you don't think it is practical to have the prime contract under those circumstances?

Mr. AUGUSTINE. You point to a very critical issue. It relates to the fact that if someone has to tool, why not now go to someone else—if we have to pay the price of tooling, let's get some alternatives to a single contractor. The difficulty is in the development of a complex system; it is inevitable that there will be changes required when you initially get it into production.

Much of the knowledge that is required to be able to produce a system initially is embodied in the people who developed it. You really need those same people to help build the initial articles that are to be produced in production. Then, once you have a data package that works, and once you have the line working, if you have a large enough quantity to buy and thereby amortize investments in another contractor, that is the time I think it is most practical to bring on alternate sources.

Chairman ROTH. My time is up.

Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

Mr. Augustine, you mentioned two things that were of interest to me about small contractors needing our attention and our help. I assume in one respect you are talking about the fact the prime contractors on many occasions have a so-called cost plus type of contract where they can be reimbursed for those costs over and above what actually it costs them. But as you get down to the lower levels of subcontractors, you find many of them on a fixed fee basis. As a result, we are seeing a loss on many of these small subcontractors out of the defense procurement business.

That is, I assume, one aspect of the problem that needs attention.

But there is another aspect which hasn't been addressed during the course of these hearings which I hope will be at some point. That is, to what extent do current procedures permit small business associations or administrations' ability to give a certificate of competency to a subcontractor who is not capable in the contracting officer's judgment of meeting up to specifications? I won't go through the whole litany of horror stories. I can site you case after case where contracts have been let to companies who have demonstrated their inadequate performance. Either they have engaged in a measure of fraud or have demonstrated a measure of ineptitude. In either case, the contracting officer can be overruled by simply going over to the SBA and securing a certificate of competency. That is not an issue I think has been addressed fully in these hearings.

As I understand your recommendations, they are not too much different from those set forth by Deputy Secretary Carlucci.

The question I have concerns decentralization. According to Mr. Carlucci's memorandum, the OSD, review points would be reduced from four down to two within the DSARC process, and give more responsibility to the individual services. I assume you subscribe to that approach in order to have some measure of accountability. Currently, there is nobody we can point to at any place along the way to say you have made a mistake. There is no accountability.

What you are recommending is that DOD we get down to specific individuals who not only have some responsibility but accountability. However, I do have a problem with decentralization. How do you reconcile decentralization with the problem of interservice rivalry? One of the reasons for having a centralized system is that someone at the top can take the big view of how much money we have got to spend. Along comes a new administration with a new approach which decentralizes the decisionmaking process, delegating authority back to the service level. How do you reconcile that with interservice rivalry?

Mr. AUGUSTINE. I think there are two fundamentally different roles in the Office of the Secretary of Defense where I served and in the services where I have also served. I think the Office of the Secretary of Defense is there in part with the specific job of preventing unconstructive interservice rivalry. There is no question that rivalry exists. Some of it is healthy, some of it is not. The people in the Office of the Secretary of Defense, I think, should be addressing questions such as should we have a 600-ship Navy or should we instead have 26 divisions in the Army or should we have 47 tactical fighter wings? That kind of question. Clearly those tradeoffs can't be addressed by the services.

At the same time the OSD, I would say, has spent a great deal of its time worrying about what the sweepback on the wing of a tactical airplane should be or is the wing box adequate on some aircraft, and such things really better done by the services.

In so doing, they have failed to take on the area where they could have the most impact. I think it is a matter of each doing the thing they are best capable of doing.

Senator COHEN. You have suggested that the Government do business only with those companies who have served it well in the past. In view of your testimony that about 52 percent is the average overrun on most, if not all contracts, which companies are we to do business with? DOD has $47-billion overrun and 47 systems. What kind of a recommendation is it we only do business with companies who have served us well in the past?

Mr. AUGUSTINE. As you would know, when we as individuals buy something, by and large we do business with people who have treated us well in the past.

Senator COHEN. We have a $47 billion overrun, now which companies have treated us well in the past?

Mr. AUGUSTINE. The point I am trying to make is in the past the DOD acquisition process has not generally recognized past performance. If it would do so, I think the contractors would quickly realize past performance matters and place more emphasis on it. The problem you point to, I think, wouldn't have to continue to exist.

Senator COHEN. My time is up.

Chairman ROTH. Senator Pryor.

Senator PRYOR. Mr. Augustine, I have been interested for some time in the Defense Science Board itself. I have been trying to do a little research on it. First, I would like to know what impact in an advisory capacity the Defense Science Board has on defense procurement decisions?

Mr. AUGUSTINE. The Defense Science Board, as you know, is an advisory board. It has the impact of any advisory board. It gives advice which can either be accepted or ignored; depending on how good the advice is and whether or not the recipient of the advice cares to accept it. Our batting average, I think, is mixed. There have been cases where we have been listened to and others where we have not, perhaps for good reason, perhaps not. I think one of the major impacts the Board has had is that many of its members at one time or another have gone on and served in Government and have had the opportunity to try to implement personally some of the things that came out of the Board's deliberations.

That informal impact has been one of the more effective means——

Senator PRYOR. Do you have votes?

Mr. AUGUSTINE. I am sorry, Senator, I don't understand the question.

Senator PRYOR. When you are sitting around in an advisory capacity, I assume you discuss these matters, weapons, procurement policies, then do you vote on whether or not you make certain recommendation?

Mr. AUGUSTINE. We rarely have a formal vote. Usually we seek some form of consensus. Occasionally we have a formal vote and submit minority opinions when we are unable to obtain substantial agreement.

Senator PRYOR. What was the Board's advice on the MX?

Mr. AUGUSTINE. The Board recently looked at the environmental impact statement and the suitability of that statement. The Board looked, about 2 years ago, at various alternative deployments for the MX. At that time, from among the alternatives it looked at, it proposed a version of the missile roughly the size of the at present one in a multiple aim point system. That study was conducted at least 2 years ago.

Senator PRYOR. What recommendation did you make on deployment of the MX missile?

Mr. AUGUSTINE. As to whether it be deployed or not or with respect to configuration?

Senator COHEN. The basing mode.

Mr. AUGUSTINE. Of the limited alternatives looked at, again this was 2 years ago, the MPS approach was the one the particular subcommittee of the Board considered was most appropriate.

Senator PRYOR. So you recommended the basing mode that we know now in Utah and Nevada which the President scrapped?

Mr. AUGUSTINE. I wasn't involved in that part study; it was prior to my becoming chairman, and was a separate subcommittee of the DSB. I don't recall whether they looked at specific States or not, but they did concude the MPS approach was the most appropriate among those that they considered.

Senator PRYOR. A few of the members, and, once again, I am not challenging their integrity or your integrity, but on the Defense Science Board, we have the vice president of Hughes Aircraft, an official of the TRW, one of the major contracting consulting firms in the world, probably most of its business comes from defense, president of Mitre Corporation, one of the major consulting firms out on the beltway, the president of Lockheed, the vice president of Texas Instruments—I am looking down the list here—the president of a major engineering firm, president of Rand Corp. I think 97 percent of all of their business comes from the services. More specifically the Air Force. Booz, Allen and Hamilton—a high official does a tremendous amount of Federal Government work. And on and on.

I am a layman in this but this to me looks like a very cozy relationship because these same people ultimately get these contracts and they are voting in an advisory capacity to advise the Pentagon on what to do, and these are the same firms which really reap the benefit from those ultimate decisions.

Do you have a comment on this?

Mr. AUGUSTINE. I certainly do. The list you read omitted the people who are not with industrial firms such as university presidents, consultants, Nobel prize winners. We follow a practice, by law, that anyone who is involved with a firm that could be related to an issue has to disqualify themselves. Every member of any of the task forces we have formed has no interest, relating to their employment with that particular issue. This is obviously crucial.

Senator PRYOR. Has that been the practice in the past or is that the practice today?

Mr. AUGUSTINE. That has been the practice ever since I have been familiar with the Board.

Senator PRYOR. Did any of these firms receive contracts relative to the MX missile?

Mr. AUGUSTINE. There was no one on any study of the Defense Science Board with a firm that received a contract for any program related to any study.

Senator PRYOR. There was about a billion dollars worth of work on MPS system and none of these firms participated in those dollars?

Mr. AUGUSTINE. No representative of any of those firms participated in any study relating to that program. There are many members of the Board with universities, with not-for-profits, private consultants; and when we form a task force to address a given study, we pick people who are not involved in any way in the execution of the matter at hand.

Senator PRYOR. Once again, as a layman it looks like to me like a list of the who's who in the military-industrial complex to me, this list on the Defense Science Board.

Mr. AUGUSTINE. The members have been picked by the Secretary of Defense over many years. It is a nonpartisan group. The Secretary has apparently elected to pick people who know something about defense and they tend to come from universities and industries where they have an involvement in defense matters. We, by law, follow a strict practice of disqualification. I am not aware of any problem that has ever occurred with the Board in that regard.

I feel very strongly about that matter, as you can sense. I think it is crucial.

Senator COHEN. I would like to make a couple of quick points, Mr. Chairman, to follow up on the decision of the MX.

I sense there is some tentativeness in your response to Senator Pryor about the decision of the Defense Science Board having been made 2 years ago.

You are aware the survivability depends on mobility, as far as the MX missile is concerned. You don't dispute that decision reached 2 years ago?

Mr. AUGUSTINE. The reason I was tentative on that, is that I was not Chairman of the Board 2 years ago, so I had no way of being involved in that study.

I will be happy to request that the Board provide you a copy of the study, or have someone come and testify.

Senator COHEN. I want to be sure of it because I held up the Defense Science Board's conclusion to the Secretary of Defense when he came before the Armed Services Committee, before which he testified to the hardened silo.

I yield back and thank you, Senator Rudman.

The Defense Science Board has a good reputation of high quality studies which, in fact, are also critical of the Department of Defense. So I will support what Mr. Augustine has said about its quality and credibility.

Mr. AUGUSTINE. Thank you very much.

Senator RUDMAN. I would say to my friend from Arkansas, I have been very interested in this Board and talked with a number of members of it. What you raise is certainly on the surface a very legitimate issue.

The problem is that for the kind of evaluations that are required, there are no other people in the country who have the kind of expertise as the people in the universities and defense industries who understand these.

I think you do take steps to assure conflicts do not arise.

I am very interested in a new term I find. We now know about 3P. We now have 3P Guide, looking at your statement. It is a very interesting section you are addressing, preplanned product improvement. I want to ask you one question about that section of your statement. It is my understanding that one of the duties of your Board is to make technical feasibility evaluations and to advise the Secretary as to whether or not certain projects proposed to be undertaken by the services are practical and cost-effective.

Do you agree with many of the people on your board who individually feel, and in many cases, we push the state of the arts in such a way that we are guaranteeing ourselves enormous cost overruns at the beginning of some of these programs.

Mr. AUGUSTINE. I think your point we push the state of the art very hard is true.

I mentioned the "last few percent" as you approach to the edge of the state of the art is where most of the problems occur that contribute to cost, unreliability or what have you. There are correspondingly those who will argue persuasively that it is that last few percent that may make the difference between what our adversary has in capability and what we have.

It is in the general view of the Board, and it is my view, that it may be appropriate to back off a bit from what we have been doing in the past and be willing to put more emphasis on something like the P^{3}I you mentioned, which is a term I coined for Preplanned Product Improvement. The idea is to take systems you already have and already paid for, plug in a new component that gives you a substantial margin of improvement, and thereby leverage the cost of that component without having to buy an entire new system.

I think that is an important alternative, not a replacement but an alternative, for seeking that last bit of performance all the time.

Senator COHEN. I would agree, and would say in my view one of the most important functions of your Board is to raise red flags to the laymen who hold the position of Secretary of Defense when there are problems.

I wonder how often does the Secretary of Defense ask the Defense Science Board to evaluate a technical specification being proposed for a new weapons system?

Mr. AUGUSTINE. I would like to be specific in answer to your question. We are asked several times a year, I would say, to examine a specific major program with respect to what capabilities are required. The most recent one that comes to my mind, Senator, was a question about a space-based laser. There are those proposing a major expenditure in that area. Obviously, to a group of scientists on a Defense Science Board, one might think that would be an appealing project. However, the Board concluded that we should not initiate a prototype program. The technology is not ready, and the payoff is not clear.

Senator COHEN. How long have you served on the Board?

Mr. AUGUSTINE. I have been Chairman of the Board 1½ years. I have been on the Board, I guess 4 years, and I have served as a consultant to the Board for many years, perhaps 10.

Senator COHEN. Are you aware whether or not any features of the XM-1 Abrams tank came before the Board and for advice to the Secretary?

Mr. AUGUSTINE. I am quite familiar with the tank because of my role with the Army, but I don't recall the Board ever looking at it. I could well be mistaken. I would be happy to check.

Senator COHEN. The whole idea of preplanned product improvement is certainly very appealing to those who have to get involved in the authorization and the appropriations process.

Certainly I would hope the Defense Science Board is going to take a long, hard look at the Air Force's requirement of a new transport for the rapid deployment force.

If we look at our commercial aircraft and how they could be modified, 47's, 1011's, DC-10's, if we look at the present C-5A, we have to ask ourselves the question whether the last increment of performance and payload that we could buy with this brandnew airplane would be desirable compared to using what we already have, somewhat modified.

I think those are the kinds of decisions and advice that are urgently needed from people like the very extraordinary people that make up your Board.

I appreciate having you here this morning.

Mr. AUGUSTINE. Thank you.

Chairman ROTH. Mr. Augustine, the time is moving on. There's a number of very interesting points you make in your written presentation, some of which I would be interested in exploring further.

For example, you talk about building incentives in some of these areas or penalties for unrealistic estimates. I would be interested—perhaps the easiest way is for us to provide in writing some further questions as to exactly what you have in mind, how would these penalties—what kind of penalties are you proposing and how would they apply.

You also talk about eliminating a number of levels. I said in my opening remarks I gather there are 7 or 8 levels of management over at the Pentagon.

I would be interested in learning how these extra layers could be eliminated.

But rather than take the time this morning, because we do have two further witnesses, I will not. I would ask, if you could, submit in writing the answer to any further questions we have.

Mr. AUGUSTINE. I will be very glad to do that.

Chairman ROTH. Thank you, Mr. Augustine.

Mr. AUGUSTINE. Thank you.

[Mr. Augustine's prepared statement and responses to written questions submitted by Senator Roth follow:]

PREPARED STATEMENT OF NORMAN R. AUGUSTINE

The Defense Acquisition Process

Mr. Chairman and members of the committee, among the many weighty matters that come to your attention I suspect that there are few which could have a more fundamental impact upon the very existence of our nation than the matter of defense acquisition. It is, therefore, a particular privilege for me to have this opportunity to share with you my views on some of the problems as well as, hopefully, some of the solutions which relate to the defense acquisition process.

My perspective on these matters is as one who has served in the Office of the Secretary of Defense under such individuals as Secretary McNamara and Deputy Secretary Packard during the periods of change they each introduced; as a former Under Secretary of the Army; as a vice president of two large industrial firms, as a board member for a small industrial firm; and as a student of the acquisition process participating in independent activities on behalf of each of the military departments and such other organizations as the Executive Office of the President, the National Aeronautics and Space Administration and the General Accounting Office. This diversity of viewpoints is in many respects a liability. If one need be concerned with only a single perspective it is, frankly, much easier to find solutions. The difficulty is that, in the words of H.L. Mencken, "For every problem there is one solution which is simple, neat, and wrong."

Probably no one can speak on behalf of all the above organizations; certainly not I. Hence, I particularly appreciate your invitation for me to appear before you as an individual. The views I will express will, therefore, be entirely my own. Some of these views would most assuredly not be shared by my colleagues in industry. Others would undoubtedly not be shared by my former associates in government. Nonetheless, it is my sincere hope that I might assist you and the Department of Defense in the matter of improving the acquisition process. This is a critically, and I use the word advisedly, important task.

I would like to be able to assure you that if the Defense Department were managed with perfect efficiency our military concerns would vanish. Unfortunately, this is not the case. As long as an intelligent adversary spends perhaps 70 percent more on military forces than we do there is no degree of efficiency which will resolve our current military shortcomings: only arms restrictions or increased defense spending can fully redress this imbalance. But a part of the answer does in fact reside in a more efficient acquisition process, and this is what I would like to address in some degree of detail. Certainly, to have increased defense spending without a concomitant effort to increase the efficiency of the spending process would be counterproductive at best and irresponsible at worst.

No one could confuse the enormity of the task of managing the acquisition process conducted by the Department of Defense with the challenge of managing more ordinary industrial activities...to which the former is nonetheless often compared. First of all, defense research, development and procurement managers alone are called upon to assure the correct and efficient expenditure of some 300 million dollars per day. Secondly, unlike most commercial practice, there is in the case of most of the relevant defense products but a single buyer. Thirdly, after an initial and often intensely competed phase of an acquisition program, the circumstance frequently arises wherein it is impracticable to preserve more than a single seller.

Taken together these three factors provide the formula for a unique set of problems; a set of problems which in my judgment will require for their solution a willingness to accept suhstantive new approaches and not a predisposition to dismiss each new idea merely because it is in fact new or because it, too, has imperfections. The goal, unfortunately, must often be to find the solution with the fewest flaws.

It is instructive to begin by asking how good or how bad is the defense acquisition process? To assist in this examination it is appropriate to define the purpose of that process as one of providing equipment to the military forces when it is needed, with the necessary performance capability, and at minimum cost. Thus, three fundamental parameters emerge: schedule, performance and cost. Each is exceedingly difficult to assess quantitatively in an absolute sense; e.g., should a certain, say, airplane, cost as much as it in fact costs? It is, fortunately, easier yet still important to address the question of why it seems to be so difficult to produce that airplane for the cost that was originally estimated on the originally prescribed schedule and providing the performance initially intended.

The data I have collected over the years indicate that the acquisition process in general does moderately well in assuring that performance goals are met. About three-forths of the time these goals are met or exceeded, and in no more than approximately one-tenth of the cases does the process fall short of performance goals by more than 20 percent. On the other hand, these data reveal that schedule overruns of one-third or more occur fully half the time.

The most recalcitrant problem, however, is the matter of cost control. The evidence I have gathered to address this issue has been culled so as to include only completed major programs. Adjustments have been made to account for changes in procurement quantities relative to those upon which the initial cost estimates were founded and the effects of inflation have been eliminated. Under these circumstances and over a long period of years, the chances of a major program being completed within its initial cost estimate (R&D plus procurement) is found to have been about 9 percent. The chances of a program being completed with no more than a 50 percent overrun are no better than 70 percent, and the median, as distinguished from the average, overrun is approximately 32 percent. The average overrun under these conditions is in fact nearly 52 percent. Clearly, we must do better. Fortunately, we can do better. In fact, the trend for each of the past three decades has, as least as best as I can determine, been one of gradual improvement.

One other important parameter is generally left out of such assessments, and indeed the data with which to evaluate it is sparse, imprecise and all too often even misleading. The parameter to which I refer is, of course, reliability. It is obviously of little consolation for an item of equipment to produce superlative performance when it is working only to fail to function when it is most needed. The data I have been able to assemble on this topic is not sufficiently trustworthy for me to share it with you; however, I can say that in my experiences in visiting forces using US equipment in the field in areas ranging from Korea to Berlin, Viet Nam to North Africa and the Arctic Circle to Panama, all suggest that a paramount problem for users is reliability and maintainability.

How have problems such as these been permitted to arise and persist over so many years...and who is to blame? Unfortunately, there is enough blame to be shared by all; including the Department of Defense, the defense industry and, yes, I would respectfully point to the Congress as well.

But rather than seek to allocate blame, it is more rewarding to undertake to identify possible solutions. As it happens, I have for some years been keeping an informal list of candidate improvements to the acquisition process. I would like to share that list of "initiatives" with you for whatever assistance it might be in your deliberations. You will recognize in some of them considerable similarity with the "Carlucci Initiatives"; in fact, I find myself in agreement with a very large majority of Secretary Carlucci's initiatives. I believe they are soundly conceived and address many if not most of the underlying ailments of the acquisition process. The problem, of course, with his initiatives...as well as my own...is perhaps best suggested by a quotation from Shakespeare's Henry IV:

> "I can call spirits from the vasty deep."
>
> *****
>
> "Why, so can I, or so can any man.
> But will they come when you do call for them?"

Indeed, the easiest task in addressing the defense acquisition process is that of identifying the problems; or at least the symptoms. It is considerably more difficult to determine the solutions...and incredibly more difficult than either of the above to make any of it happen.

This observation in humility notwithstanding, the following twenty-five initiatives are proposed to strengthen the acquisition process, presented roughly in order of their perceived importance. It should be emphasized that items which happen to appear near the bottom of the list are by no means unimportant...they appear there simply because they are far more important than all those other potentially appropriate actions which were, nonetheless, not elevated to the list at all. The list follows:

o Adopt new approach to cost estimation. Current techniques for cost estimation frequently recognize only those tasks which can be identified a priori. In undertakings involving advanced technology it is seldom possible to foresee explicitly all the demands which will occur for additional funding over the typical eight-year life of an engineering development program, or the ensuing ten to fifteen year duration of a production program. This is simply too great a demand to make of human prescience. However, this category of problem is readily handled on a statistical basis, much as actuarial tables are generated in the insurance industry with high confidence in the aggregate. One approach to this form of cost estimating is known as the TRACE, Total Risk Assessing Cost Estimate, approach. Some avenue, of which TRACE is but one candidate, should be adopted for all major engineering development programs as well as for all significant production programs. Simply stated, the task of managing major acquisition programs embodying high technology is a problem in managing uncertainty; hence, managers must be given tools which at least recognize the existence of uncertainty. This has seldom been done in the past.

o Increase emphasis on high reliability. Japanese industrialists tell us that by demanding high quality, costs are actually reduced; not only over the entire life cycle of an item but in the production phase as well. To assure high availability of an item a contractor must design reliability into the hardware from the outset and should, therefore, be strongly incentivized to do so, both with rewards and penalties. Additional funds should be provided for increased reliability testing, especially at the component level and emphasizing testing under realistic environmental conditions of temperature, temperature-rate, vibration, dust, altitude, salt spray, etc. A "Design to Reliability" approach analogous to the existing Design to Cost approach should be adopted. Finally, a much more effective system of feedback and follow-up of field failures should be established. The attitude must be instilled throughout all levels that failures cannot be simply dismissed as unusual occurrences. There is no such thing as a random failure.

o Demand program stability. One of the greatest contributors to unnecessarily high costs is program turbulence: changes in schedule, changes in objectives, changes in funding, changes in people.... Discipline must be instilled that once a decision has been made to conduct a program, that decision cannot be reopened absent significant changes in one or more of the factors underlying the initial decision. When technical problems are encountered, and they will be, it is usually best to "tough it out" and solve them. The habit of terminating existing programs with known problems in order to initiate new programs (with unknown problems) is generally an exercise in self-delusion. It should be made a matter of policy that changes simply will not be tolerated at any level of management except for the most compelling of reasons and authority to approve changes should, as an inhibitant, be placed at a very high organizational level. Even apparently trivial changes, particularly in funding, have a way of cascading down through a prime contractor to a handful of subcontractors to hundreds or even thousands of vendors...wreaking havoc to contracts at each step of the way.

o Encourage qualified individuals to enter and remain in program management. Competent, dedicated people are the sine qua non of effective program mangement. Prior to taking on the responsibility of program management an individual should have attended the program management school and should have served a tour as a deputy program manager. Program managers should remain assigned to their position at least until a major milestone has been met. This requires a change in attitude regarding the periodic rotation of personnel currently practiced among the military officer contingent and currently implicit in career advancement patterns. Program managers simply must be kept in place for much longer periods of time. If this is unacceptably deleterious to the military careers of the individuals involved, the only alternative would seem to be to employ civilian program managers. This is a much less desirable solution in my opinion for a number of reasons.

Individuals who do accept the very difficult positions embodied in the acquisition process need to be appropriately rewarded, both financially and in terms of job satisfaction. The current government pay ceiling is an example whereby an effort to insure economy results in the loss of some of the most highly qualified individuals to run multi-billion dollar programs. It is counterproductive to seek to save a few dollars in salaries when by so doing, a greater likelihood is of accepted errors being made affecting large sums of money. No industrial firm which embraced this policy could survive.

o Delegate authority and responsibility to a much larger degree. The defense acquisition process is much too diverse and demanding of specialized knowledge to be managed in a highly centralized fashion. Authority should be delegated to the Services to a much greater degree, with a concomitant placement of accountability upon specific individuals by name. It is equally important that the Congress delegate to the Defense Department the task of managing the defense acquisition process given overall funding and objective guidelines. Such delegation clearly introduces the possibility of occasional failures. The current practice, however, is coming dangerously close to eliminating the chances of occasional successes.

o Incentivize realism in contractor and government cost estimating. A group of highly qualified individuals should be assigned the task within the Office of the Secretary of Defense of providing independent cost estimates. The estimates of this group should be used as the basis for decisions to begin new programs and for funding of programs, absent these estimates being overruled at a very high level. Simply stated, the pressures in the acquisition process to obtain approval of programs and to be selected as the winning contractor are such as to make realistic cost estimation from the working level organizations highly problematical at best. Contractors should be selected for cost reimbursable contracts based upon the government's assessment of the contractor's most likely cost...not upon the contractor's claims. Penalties should be introduced for unrealistic estimates. Greater emphasis should be placed on past performance. This latter action could be enhanced by a continued increase in the use of award fee contracts with the award fee evaluation serving as a basis for assessing "prior performance" during subsequent source selection evaluations. The fourstep procurement process should also be used more widely in awarding cost-reimbursable development contracts. Finally, fixed price contracts should be recognized as simple, elegant, tempting and totally inappropriate instruments for development efforts involving significant uncertainty and risk. They are, however, quite important for follow-on production contracting.

o Maximize the use of competition. Competition among potential sources is an extremely effective means of controlling costs and insuring performance and schedule adherence and should be exploited wherever practicable.

Unfortunately, there are many circumstances where it is not possible to achieve the benefit of full competition because the quantities of equipment to be purchased are insufficient to amortize the costs of competing and tooling a second potential supplier. Even in this case it is often possible to introduce competition at the component level. In any event, programs should be tailored from the outset to maximize competitive pressures upon program participants insofar as is senible.

o Incentivize improvements in productivity. It is widely recognized that US industry as a whole suffers severe problems in the area of productivity. The defense industry is not, unfortunately, an exception. Specific actions can be taken to encourage increased contractor investment in capital equipment which will in turn reduce costs. There is at present insufficient incentive in many cases for industry to seek efficiencies because the cost of introducing those efficiencies is drawn from profits and the benefits accrue to the government. The government should, therefore, adopt procedures to realistically share cost savings with contractors and to incentivize investment. The latter can be accomplished through such means as more strongly coupling profits to capital investment, modifying the cost accounting standards to match the Internal Revenue Service policies on recoupment of depreciation, permitting depreciation based upon replacement cost rather than initial cost, recognizing inflation in determining profit levels for longer term cost-reimbursable contracts, adopting multi-year procurement, and paying progress payments on a schedule consistent with the impact of the prime rate.

o Provide management the latitude to manage. Under present acquisition practices budgets are by-and-large established one to three years prior to their actually being executed. The technological and procedural uncertainties in the acquisition process are inconsistent with this degree of restrictiveness upon those who must manage. Reprogramming thresholds established by agreement with the Congress should be substantially liberalized. The USDRE should be provided a reserve which can be used to resolve short-term problems which, absent the availability of immediate funds, could have much larger adverse cost impacts. It will be noted, of course, that the introduction of such procedures requires genuine interest in delegating...and a willingness to accept the risks entailed therewith.

o Realistically budget for inflation. There are many pressures to underestimate the impact of inflation, not the least of which is that an official government estimate of high future inflation rates can become a self-fulfilling prophesy. Nonetheless, many of the instances of cost growth encountered in recent years have been more a reflection of the ailments of the economy as a whole than of inadequacies inherent in the management of the defense acquisition process. Individual program managers should be permitted to estimate the inflation peculiar to their particular programs for the budget year. With regard to the out-years, it appears more realistic to employ constant dollars as a cost metric. This still makes the acquisition process subject to reports of large overruns which in fact are merely reflections of the inflation in the economy as a whole. On the other hand, to adopt long-term estimates in then-year dollars seems to transcend the ability of economists to evaluate long-term inflation and could lead to

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the equally unrealistic situation of defense managers being cited for having reduced costs when in fact the only change which had occurred was a reduction in the projected inflation rate.

o Initiate only those programs which can be fully funded. It should be made very difficult to start new programs; requiring as a minimum that the benefits to be obtained are substantial, that they cannot be realized through product improvement of existing items, that funds are available to execute the programs on an optimum schedule, and that suitable commercial products are not available. Engineering developments should not be initiated unless there is an intent to introduce the item into the inventory if its development objectives are met. Programs should be prioritized and funds should be allocated accordingly. The practice of spreading available funds over all desirable programs is self-defeating as well as highly inefficient. This has been a particular problem in production programs in recent years, wherein the rate of production has been so low as to virtually preclude efficient operation. The key decision points in this process should be entry into engineering development (DSARC II) and initiation of production (DSARC III). These are the critical milestones for senior management in the Office of the Secretary of Defense to involve itself in the process. It will be noted that this viewpoint differs from the approach espoused in the recent Department of Defense initiatives.

o Discipline the requirements process. The last few percent of capability of a system typically generate a disproportionate share of the total cost and most assuredly of the problems encountered. The current requirements process places relatively little emphasis on cost and affordability. Requirements should be established not for individual programs in isolation, as is the case today, but for the entire military force, with the cost of each capability being estimated by the independent cost estimating group. In this manner more realistic tradeoffs can be made between the desirability of having a smaller force of highly capable items as compared with a larger force of somewhat less capable items.

o Strengthen the mobilization base. An urgent effort should be initiated to stockpile critical raw materials and long lead parts as well as selected machine tools to provide a more viable mobilization base. The current mobilization capacity of the defense industry is brittle indeed.

o Continue to embrace a fly-before-buy policy. Fly-before-buy is an effective method of introducing realism into the materiel development process. It, like most other management policies, is not, however, appropriate in all instances. Prototypes, when utilized, should generally be factory-producible items. The failure to pursue this latter policy merely adds one more cycle in the already prolonged development process. An exception to this is when an exploratory assessment is being made of vastly different high risk concepts, in which case hardware built on soft tooling is appropriate.

o Increase the priority given to logistics. Once high inherent availability (principally, reliability) has been designed into a system as previously discussed, that capability can still be eroded by the provision of inadequte logistics support in terms of spares, trained mechanics, tools and test equipment. The Services should be required to present requests for spares in conjunction with a measure of the estimated operational availability which, if funded, those requests will generate. Past practices all too often neglected the proper sparing levels, in part because of the lack of articulation of the impact of logistics funding on operational availability. Clearly, no gain is made by procuring twice as many items of equipment if only half of them are able to operate because of the lack of support parts and maintenance personnel. In the case of select major systems, perhaps twenty in the entire Department of Defense, vertical logistics organizations should be established to assure high rates of availability. It is simply not practicable to employ the same horizontal techniques of logistics support for a fleet of quarter-ton trucks as for a modern fighter aircraft.

o Reduce the number of decision makers and amount of paper in the acquisition process. In spite of the ever-growing duration of the acquisition cycle the execution time has somehow remained largely unchanged. The added time is found to have been incurred in the front-end "indecision" period and in the slow build-up of a significant force subsequent to the decision to enter production. By eliminating entire layers of the decision process both of these periods can be reduced with an associated reduction in cost. The A-109 approach, although sound from a logical standpoint, appears to have been the victim of overly burdensome implementation procedures and should therefore be dropped. The Determination and Findings process for obtaining approval to negotiated contracts is another promising avenue for major cost and time savings, as is the proposal evaluation process. Severe restrictions should be placed upon the size of proposal evaluation groups as well as on the size of proposals themselves. It is likely that by so doing the changes in the actual sources selected would be very minor...and the cost savings significant.

o Adopt Preplanned Product Improvement on a much wider basis. Preplanned Product Improvement, P^3I, is intended to seek the cost effectiveness leverage which is sometimes achievable by upgrading existing hardware... particularly when provision has been made from the very outset to incorporate enhancements in that hardware. The acquisition process needs to be modified to assure that advocates are available for P^3I approaches and not merely for the sometimes more glamorous new starts. Each DSARC addressing the initiation of a new program should be briefed by an independent Red Team which makes the case for pursuing a product improvement as an alternative to undertaking an all-new development.

o Minimize the disruptive aspects of foreign military sales. Foreign Military Sales, FMS, have grown to an enormous level and thereby represent a major demand on the managers of the defense acquisition process. Because of international political considerations it is sometimes important that hardware be delivered to allies based upon very short notice. This can be disruptive to ongoing programs, and in many instances could be avoided by providing a pool of funds to stockpile selected items for future FMS. This stockpile should necessarily include only those items which represent high

FMS demands, and for which one can be virtually assured of future needs. By so doing, delivery times for equipment required by allies can be reduced substantially, disruption to production intended for US forces negated, and in those rare instances where demand does disappear, equipment becomes available for use by US forces and the funds are thereby not simply wasted.

o Undertake a set of initiatives to strengthen the vendor structure of the defense industry. A great deal of attention is focused on the prime contractors which support the Department of Defense and many incentives are being introduced to enhance their performance. It is, however, in many instances the smaller second and third tier vendors which represent the critical choke points and which are in the greatest position of financial duress. A set of initiatives should be established specifically to help such subcontractors, focusing on those industrial segments providing key items such as forgings, complex castings, microelectronics and the other high priority hardware.

o Encourage the introduction of new concepts which offer quantum jumps in military capabilities. There is, not surprisingly, frequently a prudent resistance to adopting radical new technologies and capabilities, even when the potential payoff of those technologies appears large. This is particularly true when the proposed concepts cut across or otherwise depart from the existing structure of users and developers. An advanced concepts organization should thereby be established, possibly within the Joint Chiefs of Staff, whereby funds would be provided to prototype selected new system concepts somewhat as is currently being done by the Defense Advanced Research Projects Agency. The DARPA could then be permitted to focus once again its attention on more basic research which is also extremely important to future military capabilities. Similarly, industry should be encouraged to focus more of its funds on true research and exploratory development rather than on the less creative efforts of proposal writing. This could be done in part by eliminating altogether the practice of industrial sharing of Independent Research and Development expenses.

o Increase utilization of contracting-out. The government has an important role to play as a manager of the acquisition process. By and large, however, the government is not as effective a supplier of goods and services as is industry. Furthermore, these two classes of activity frequently represent a conflict of interest with one another. Whenever possible, the government should therefore seek goods and services on a competitive basis from private industry.

o Establish program schedules to include only modest concurrency. Concurrency, a reference to the overlap between successive program phases, is important to assure the efficient transition from one stage to another. It is obviously not possible to stop and start work forces abruptly. On the other hand, excessive overlap between phases introduces major economic risks should problems be encountered in a predecessor phase after a subsequent phase has been initiated. Considerable judgement is required in selecting the proper degree of concurrency. However, great prudence should be excercised before significant risks should be undertaken by compressing execution schedules in peacetime. Similarly, programs should be permitted to pass from one phase to another based only upon the demonstration of specific milestones (most often actual tests); and not merely because some prespecified calendar date for the transition has arrived.

o Pursue international programs on an industry-to-industry basis. A great deal of effort has been devoted over the years to the execution of joint programs with our allies. By and large, it would appear to be most efficient, as well as most conducive of success, to pursue these programs on an industry-to-industry basis with minimum governmental involvement. Focus should be placed on assuring the interoperability of equipment, since this has a much higher military payoff than assuring that equipment used by various nations is identical. Furthermore, the former objective is much easier to achieve. Emphasis should also be placed on joint production rather than joint development. Development projects are inordinately difficult even with a single set of management from a single nation.

o Adopt a policy of discounting future costs. It is common industrial financial practice to discount future costs. Although an Office of Management and Budget policy exists which requires this of government projects, the practice has by and large still not been introduced. This results in the inefficient use of government resources; overall life cycle costs, assessed over a 25-year period, are often much less important than the initial development and procurement costs. It is to be emphasized, however, that the demand for operational reliability and maintainability is separate and distinct from this consideration and represents an important goal in its own right.

o Place increased emphasis on design-to-cost. The practice of allocating cost targets throughout the work breakdown structure of a system is a useful means of increasing the discipline of the design process with respect to controlling production costs. This approach should be given renewed emphasis. The conditions under which costs are assessed in terms of rate of production and total production quantity should be made much more realistic than has often been the case in the past, and contractor fee awards based on design-to-cost should be coupled to actual production demonstrations rather than analytical estimates.

* * *

Obviously, no single formula exists to eliminate the problems encountered over the years in the defense acquisition process. It is imperative that flexibility be allowed to competent managers to exercise judgments within broad policy guidelines. Clearly, the acquisition of a ship cannot be conducted in the same manner as the acquisition of a spacecraft or even of an artillery round. Each has its own problems and its own demands.

I hope that these suggestions will prove to be of value to the Committee in its deliberations on the defense acquisition process. With all its shortcomings, I would emphasize that the system works moderately well today largely because of the dedication and integrity of the individuals who make it work.

NORMAN R. AUGUSTINE

Norman R. Augustine was born on July 27, 1935 in Denver, Colorado and was educated in the public schools in that city. He attended Princeton University where he majored in Aeronautical Engineering and was awarded a BSE, magna cum laude, an MSE, and was elected to membership in Tau Beta Pi, Phi Beta Kappa and Sigma Xi. After graduation he took courses at Columbia University Graduate School of Business Administration, the University of California at Los Angeles and the University of Southern California.

Mr. Augustine's initial professional employment was as an Assistant in Research at Princeton University and in the summer training programs of the Boeing Company and the General Dynamics Corporation. In 1958 he joined the Douglas Aircraft Company where he held titles of Research Aerodynamicist, Design Group Leader, Chief Engineer and Program Manager.

In 1965 he joined the Federal Government working in the Pentagon in the Office of the Secretary of Defense where he held positions in both the strategic and tactical program areas, including the one currently designated as the Assistant Under Secretary of Defense for Research and Engineering (Land Warfare). Upon completing his service in 1970, he was awarded the Secretary of Defense Meritorious Service Medal.

Mr. Augustine then joined the LTV Aerospace Corp. in Dallas, Texas, where he served as Vice President Advanced Programs and Marketing, for the Vought Missiles and Space Company.

In 1973 he was appointed by the President and confirmed by the Senate as Assistant Secretary of the Army (Research and Development) and in 1975 became Undersecretary of the Army. He was awarded the Department of the Army Decoration for Distinguished Civilian Service and was twice awarded the Department of Defense Medal for Distinguished Public Service.

In 1977 Mr. Augustine joined Martin Marietta Aerospace where he is Vice President, Operations. In this capacity he has corporate responsibility for production, engineering, logistics, planning, business development and capital expenditures. He is also a member of the Board of Directors of International Laser Systems, Inc and a Member of the Corporation of the C.S. Draper Laboratory.

Mr. Augustine is a Fellow of the American Astronautical Society and of the American Institute of Aeronautics and Astronautics of which he is a Vice President and a member of the Board of Directors and has been appointed as a Distinguished Lecturer. He is President of the Association of the United States Army, Chairman of the Defense Science Board, a member of the Institute of Electrical and Electronic Engineers, and has served as a consultant to the Departments of Defense, Army, Navy, Air Force, Energy, the National Academy of Sciences and the Executive Office of the President; in the latter capacity supporting both the National Security Council and the Office of Science and Technology. He has been the U.S. member of the NATO Group of Experts on Air Defense, a member of the NASA Research and Technology Advisory Council, the Executive Committee of the Technical Council of the Aerospace Industries Association, the Policy Council of the Defense Systems Management College, Vice Chairman of the Executive Committee on Command and Control of the National Security Industrial Association, Chairman of the Navy Surface Ship Survivability Planning and Steering Group and has served on the Board of Directors of the American Helicopter Society and of the Lone Star Chapter of the American Defense Preparedness Association. He is currently serving as Chairman of the Advisory Council of the Princeton University Department of Aerospace and Mechanical Engineering, on the Air Force Scientific Advisory Board as Chairman of the Aeronautics Panel, the Advisory Panel on Procurement of the General Accounting Office (GAO), the Naval Aviation Panel of the National Research Council, the Board of Advisors of the Center for Advancement of Procurement of Florida State University, the Board of Advisors of the Society of Logistics Engineers, the Board of Regents of the Institute of Cost Analysis, as President of the Board of Visitors of the American University Procurement and Acquisition Program, on the Editorial Board of the Journal of Defense Research, and as a columnist for Military Science and Technology magazine. He has served on the Editorial Advisory Board of Astronautics and Aeronautics magazine and as an Associate Editor of the Defense Systems Management Review. He is a licensed Professional Engineer in the state of Texas, holds a copyright on a pocket calculator for baseball managers, is the author of a book entitled "Augustine's Laws", and is listed in Who's Who in America.

Mr. Augustine has held adult leadership positions with the YMCA and as chairman of a national committee of the Boy Scouts of America. He is married to the former Margareta Engman, and they are the parents of a son, Gregory, and a daughter, René.

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Responses to Written Questions Submitted by Senator Roth

Question. 1. Why aren't the excessive number of DOD projects cut back to allow for efficient procurements of the really necessary systems as recommended in a 1977 Defense Science Board Study? Why doesn't the Secretary of Defense ensure that all approved weapons productions can be accomplished within the budget and simultaneously ensure that new programs are brought into the production stage in a coordinated fashion?

Answer. According to my information, DOD has begun cutting back programs in order to fully fund those having higher priority and thereby stabilize them at more economical production rates. This fitting of programs within the budget is a painful and protracted process. An ongoing program has considerable momentum and acquires "constituencies" within Defense, industry, and Congress which are difficult to arrest. Another difficulty stems from optimistic projections of the defense budget coupled with inaccurate estimates and portrayals of current and future program costs, effects of inflation and cost growth. DOD efforts to improve long range planning and match fiscal resources to military requirements should help remedy this condition.

Question. 2. Is the perception that there is little real competition in defense procurement accurate? How would you explain and justify the wide discrepancy between intent and result concerning competition in defense procurement? Do the reasons emerge, as some insist, from considerations of simple expediency, special interest pleading, and obsession with high technology systems?

Answer. No, the perception is, as a generalization, inaccurate. Competition is intense among contractors, particularly at the subsystem, vendor, and supplier levels, and among prime contractors at the initiation of new programs. Data from the DOD indicate that for the first 9 months of fiscal year 1981, contractual dollar awards resulting from price or design competition have risen from 36 to 45 percent over fiscal year 1980. Competitive awards are proportionately higher during development and initial production due to the difficulties of maintaining the competitive environment during the production phase. Unfortunately, there are many circumstances where it is not possible to achieve the benefit of full competition because the quantities of equipment to be purchased are insufficient to amortize the costs of competing and tooling a second potential supplier. It is difficult to establish second sources for some highly complex equipment due to technology transfer problems, existence of proprietary information, and high cost of facilitization and qualification. Additionally, many systems are of such high cost and low volume that it is extremely difficult to operate even a single source at efficient production rates. It is often impractical to introduce licensing, leader-follower, teaming, and other dual sourcing techniques after the development is underway. Program stability is essential. A competitive acquisition strategy cannot be pursued in a climate of changing quantities and configuration.

Competition is of the utmost benefit and should be applied on a business-like basis; that is, when the benefits it promises exceed the costs it imposes.

Question. 3. What steps can we take to prevent "buy-ins" and other abuses in defense contracting in order to assure a more honest application of free market principles?

Answer. We must first ensure a sound acquisition strategy which recognizes and addresses program risks and uncertainties and then prepare independently-derived cost estimates for all factors. This requires continued improvement in our cost modeling and estimating techniques. We must develop realistic appraisals of the technical, financial, and managerial capabilities of potential contractors. We must set up competitions and resulting contractual arrangements that recognize and do not overtax these capabilities. Above all, we must enter into contracts which reflect the degree of risk entailed and provide the government with necessary visibility.

Question. 4. Is it true shortfalls in overall force levels can be blamed on high cost items? Can you give examples where purchases of "lo" end items would have been greater in the absence of the "hi" end item. In those cases, would planned or "objective" force levels have been any more nearly achieved than actually occurred?

Answer. Shortfalls in force levels can only be blamed in part on high cost items. Frankly, as long as the Soviet Union continues to spend some sixty percent more on national defense than we, force level shortfalls will continue to exist. But this is not an excuse for accepting anything less than 100 percent efficiency in spending our defense dollars. Sizing of force level objectives is determined by the equipment's capability, its acquisition cost, and its cost of operation. Obvioulsy, more low cost items can be bought with the same resources. The high-end item should be bought only when it is required in order to meet the threat and when it is most cost effective in doing so.

Question. 5. "Pre-Planned Product Improvement has been criticized as giving us the worst of both worlds—the equipment is low technology but costs more because it has been designed to accommodate future technological change. How do you respond to this criticism?

Answer. Pre-Planned Product Improvement, P^3I, is intended to seek the cost effectiveness leverage which is sometimes achievable by upgrading existing hardware . . . particularly when provision has been made from the very outset to incorporate enhancements in that hardware. This technique is founded on employing state-of-the-art technology at the component level—not "low technology." The objective of P^3I is to identify and isolate inordinately high risk features/subsystems that are not essential to initial fielding of the system and its satisfying the military requirement at the time of introduction. The intent is to pursue the more technologically advanced areas in parallel and introduce them at a later date when risk is compatible with the basic system and a more demanding threat has evolved. It is true that system modularity and growth provisions do contribute cost to the initial design; however, compensating factors are a more orderly development cycle and transition to production and a less troublesome service introduction . . . not to mention the ability to "recycle" major parts of existing hardware systems which otherwise would be replaced in entirety.

Chairman ROTH. Mr. Laurence Lynn, professor of public policy.

Dr. Lynn, we welcome your appearance here today.

You have heard the general approach. To the extent you can summarize, I would appreciate it, so we can have maximum time for questions.

TESTIMONY OF LAURENCE E. LYNN, JR., PROFESSOR OF PUBLIC POLICY, HARVARD UNIVERSITY

Mr. LYNN. I will submit a statement and try at this point to summarize key parts of it.

I appreciate the opportunity to appear.

My statement begins with the observation that there is wide agreement that we need to improve the management of weapons acquisition and there is also wide agreement that doing it has got to be one of the most difficult management challenges any executive in this country faces.

The burden of my point is that more attention needs to be devoted not just to identifying the problems and their unpleasant implications, but to figuring out ways to solve those problems, to making better management come about, which really means ways to introduce change in the Pentagon.

No attention devoted to this subject is going to fail to hit on the key role the Secretary of Defense plays. If that official and his key advisers, appointees, are ineffective, there is not going to be any reform in defense management. But the sobering point is, even if they are effective, capable people, history teaches that there are severe limits to what a dedicated official can do.

I think it is important to look at that history. We did a study of two previous Secretaries. Secretary McNamara, whom I had the pleasure of serving, and Secretary Laird, to see what difference were they able to make in the decisions of the Pentagon, what legacy they left behind.

What we discovered, is, first, of course, they had widely different management styles: McNamara a highly centralized, process-oriented style; Laird, a more political, informal and decentralized style of management.

The interesting finding is that both seem to have had similar accomplishments and both accomplished relatively limited numbers of changes in the Pentagon. They raised some priorities on some missions. They lowered priorities on some others.

They had an impact on a handful of major weapons decisions. But for the most part, what they were able to accomplish was quite limited and even that came with the expenditure of an enormous amount of effort on their part.

The question this raises is, why couldn't they have accomplished more? What is it that makes even the best of our officials able to accomplish relatively little compared to what our expectations have been? And that is what I would like to dwell on for just a minute, Mr. Chairman.

I think the explanation is to be found, as I think is widely recognized, in the nature of the weapons acquisition process itself. That process is characterized by its high degree of decentralization, by its technical and programmatic complexity and by the dominance and by the relative inflexibility of service and civilian research and engineering bureaucracies.

It takes an enormous amount of time and effort to influence that process in those bureaucracies, and there are practical limits as to how much time any official can devote to those changes.

Perhaps the key to that process, one I think more attention needs to be devoted to, is the very early stages of weapons acquisition. Perhaps the key is where the very conceptualization occurs.

Lurking behind every major weapon proposal that comes before the Secretary, the President and the Congress are some assumptions about the kind of combat capability that we require. These assumptions are typically made very early in the development process and they are made at levels that are often well below the scrutiny of top Defense Department officials.

And those assumptions also reflect the missions that service leaders and our technological leaders in the engineering establishment regard as the most important. Those assumptions may or may not reflect good judgment concerning the kinds of capabilities that will best serve our interests, viewed from a national perspective and viewed from an interservice perspective.

By the time the congressional and executive branch officials become aware of these assumptions, they have been hardened into concrete weapons systems proposals that have achieved considerable momentum and backing. Even though the underlying assumptions are often the primary determinants of the future costs and performance of those weapons systems, and of all the problems that are going to occur, they are seldom discussed at the right stages.

For example, if it is assumed that the United States basic tactical fighter bomber must be designed to fly from bases in rear areas to attack targets deep in Poland at night and in bad weather and if it is further assumed those aircraft must be able to identify and destroy high speed Soviet aircraft beyond visual range, then, if those assumptions are accepted, what you expect to get is highly-complex, extremely expensive F-15's and F-16's. They will be required, and that is the kind of weapons system the Secretary of Defense and Congress will be asked to approve.

The Secretary of Defense and his advisers and the Congress may pale at the costs, be skeptical of the need, but the opportunty to prevent momentum from developing behind questionable ideas has long since passed.

Instead of a well-informed debate over the kind of capability needed, and what we are willing to pay for it, the kind you have been inquiring into today, there will be a head-on clash between skeptical but inexpert civilians, frustrated civilians, and the Nation's senior military leaders backed, often, by their contractors.

It is an unequal struggle.

I go on to point out that virtually every administration, at least since the 1960's, has tried to confront this problem. What we have observed over time is a collection of management efforts to solve it, to solve various aspects of it. Some have been designed to bring these underlying problems to light. Others have been designed to insure that operational testing, independent evaluation of test data occurs before we have made major procurement commitments. Others have been designed to put cost discipline on contractors and on the services. And I list several of those different efforts, most within the Pentagon, some introduced by Congress, some introduced by the Office of Management and Budget.

But, as I say, Mr. Chairman, many have tried to reform the weapons acquisition process, but the problems, unfortunately, remain.

That brings me to the final remarks I would like to offer. The current administration, too, is determined to reform the way we buy weapons. But whereas previous administrations sought to tighten the Secretary's control over key aspects of the process, Secretary Weinberger and Deputy Secretary Carlucci are implementing what they call controlled decentralization whereby subordinate line executives, especially the service program managers, will be held accountable for executing policy decisions reached by the Secretary after he consults in a participatory way with his top subordinates.

Mr. Weinberger and Mr. Carlucci are acting on the conviction that problems of cost overruns and hardware that performs poorly and is difficult to maintain and operate were made worse by previous attempts at detailed centralized control, especially by the DOD research and engineering community.

Perhaps they are right. There could be no question that among the results of previous attempts at managing weapons acquisition have been complexity, confusion and delay in decisionmaking.

The frustrating aspect is that the more complex and confusing the process, the more it seems to compound the management problem. It is Murphy's law: All moves designed to simplify the process will make it more complicated.

The proof of this administration's claims will be in the execution and the results they achieve, and here I believe substantial skepticism is warranted.

We have tried before to leave the management of weapons acquisition to the services in the 1950's. It was a substantially decentralized process. And the results led to the first major critical study of the weapons cost escalation and performance problems. It led to the creation of the very Office of Defense Research and Engineering now regarded as a problem, and it also led to President Eisenhower's famous warning of the dangers imposed of the military industrial complex. Moreover, those were times when DOD faced tighter budgets. With the great increase in spending for procurement we now have in prospect, the potential for abuse seems to me to be greater now than then.

The administration's approach to managing weapons acquisition, much of which, too, I would agree with, but unfortunately much of its spirit, particularly those parts in Mr. Carlucci's memorandum of April 30, is naive concerning the sources of the problems with the weapons acquisition process.

I doubt they will be able to prevent momentum from developing behind questionable proposals and what I expect to see in the next few years, if the spirit is carried through, is an increasing involvement of the committees of the Congress in oversight of weapons acquisition management, as controversies over cost and performance problems multiply.

The administration, unfortunately, says: We have studied the problem to death, we now know the answers, and therefore, we don't need to think about the problem of managing anymore. Let's just act.

There certainly have been many studies, perhaps many too many.

My problem is I am not convinced all of them have gotten to the underlying problems or identified precisely the solutions that could make a difference.

I would have more confidence in the adequacy of that study effort if the recent history were different, if we had not witnessed successive Secretaries casting about in frustration for ways to control a process that remains stubbornly resistant to change.

To conclude, this committee and other committees with oversight responsibility in the Congress would be performing a great service if it could satisfy itself as to what we know and don't know as to how the leaders of the Department of Defense could effectively influence what weapons we buy, what we pay for them, and what we get in return. What examples do we have, for example, of exemplary management in the past, and how can we replicate that management?

I can think of no more important contribution at this stage of our existence than good public management.

Chairman ROTH. Dr. Lynn, let me start out by saying that any specific suggestions you may have as to what you think a committee such as this could do will be most helpful. I am not on either the Armed Services or Appropriations Committee, so I have no expertise in this area. But as I listen to you and some of the others, let me see if I am understanding you correctly.

One of the basic weaknesses of our system is that there is not adequate control of the determination of need or our requirements.

Mr. LYNN. Yes, sir, that is correct.

Chairman ROTH. As one who knows nothing about it, it seems to me that simplifies the problem considerably.

Why isn't it appropriate—as I understand the Carlucci memorandum, that the Defense Secretary's Office is going to determine overall requirements of a 600-ship Navy, whatever it will be, and the Navy will decide how to implement that?

In your illustration you say if they decide a plane has to be able to go from the back bases to bomb Berlin, the decision has already been made as to requirements of a need.

Mr. LYNN. Yes, sir.

Chairman ROTH. Are you saying, then, the Department of Defense should, at that juncture, and the congressional committees, play a key role.

Mr. LYNN. I am, Mr. Chairman.

Two observations: First, I am not sure force structure control, controlling numbers, is really the answer to the kind of problems frustrating us.

I think many of the problems we are looking at now are really problems with particular weapons: the particular missiles, aircraft, and ships.

Following Senator Rudman's observation, weren't there alternatives that would have been more efficient? What I am saying is, what is important is to start to identify the kinds of problems that get incorporated in the weapons proposals we will see 3 and 4 years from now. I bet you can get a good feeling for that by looking in the R. & D. budget.

A good set of questions and a good set of issues to address to the Secretary of Defense and a good thing for him to become involved in is those early-on ideas, is the basic thinking that goes into the next generation of weapons systems that are going to come down the line.

Unfortunately, shortrun concerns drive out that kind of thinking. It is hard to think it is important when you have cost overruns facing you now.

What I am suggesting is, you will never get out of the box you are in unless some substantial amount of attention is devoted to that early stage concept formulation, early development effort.

That is where I think a lot of ideas and debate need to take place.

Chairman ROTH. Let me ask you this question. Again just listening, if I understand what you are saying, we ought to be looking at the long-term requirements now because if you wait until after the R. & D., then you have already started down the road.

Mr. LYNN. Yes.

Chairman ROTH. Is the next critical stage of control production?

Mr. LYNN. Well, I am personally not sure I have a strong view about the relative merits of controlling both the engineering development phase and the procurement, contracting phase. I know a lot of discussion has been had here. Mr. Augustine's statement is a good case in point, and a lot of the content of the Carlucci memorandum are the 66 good ideas for changing things, changing the cost estimates, changing contracting arrangements, changing a variety of these procedures.

A lot of times, whereas we can imagine they will do some good, often I think what a lot of those proposals amount to is trying to change things after the problem has really gotten too far to influence.

There is also another problem I see and here is where I think I agree in spirit with the administration. A lot of what the OMB does, I think a lot of what the committees of Congress have done recently has been a reaction to observed problems. What happens is that some regulation or feature of law is introduced to make certain no public official makes the wrong move. We don't want them to make mistakes. So they have to provide information, get clearance, and they have to go through a certain amount of process in order to justify the actions they are going to take.

The problem is, while you are preventing an official from making the wrong moves, you are preventing him from making the right moves, or any move at all. In that regard, we want to give executives substantial opportunity to actually manage where it is clear we want the product.

And there, I agree, introducing competition, introducing more economical approaches to the procurement process have got to be a good idea. That is assuming we know what we want. A lot of time the controversy we observe is because we are in disagreement over what we want: do we want that airplane, how many do we want, can we modify it, isn't there something we can do to make it more satisfactory? That is what is producing a lot of the difficulties in the progress of these projects.

Chairman ROTH. Part of the problem is that committees tend to concentrate on the bad examples and then pass regulations which do nothing but, as you say, make the whole operation much more complex and builds paperwork rather than providing for sound management.

I strongly agree with that point.

Senator Cohen?

Senator COHEN. Thank you, Mr. Chairman.

Dr. Lynn, I find myself in a great deal of agreement with what you have had to say today, even though it is quite pessimistic, I must say. Then again Harold Brown said after his years of experience in the Department of Defense that he found it was virtually impossible to manage.

What you have said in your opening statement about the function of this committee should be to find ways to introduce change in the Pentagon. I think that really is the crux of the problem. How do you deal with a mind set which finds change to be threatening, or to be radical or to be dangerous, or to be unpatriotic?

It may not be relevant, but a good deal of time and energy is being spent in the Pentagon to set up watch groups on the so-called reformers. Those of us who are raising questions on whether we should spend this much money on particular weapons system, find our words are being watched.

For example, we made a recommendation to the Secretary of Defense that perhaps it would be important to set up a Team B within the Pentagon itself, saying that we would like to have a second opinion within the Pentagon. We are laymen and we have four committees to serve on. We run like the bulls at Palomas. Whenever the bells ring, we are off to a different vote, to a different committee, another committee. Everybody realizes that time is the enemy of the Congressional process, that there simply is not enough time. We are not expert enough because we cannot devote single mindedly our attention to the process.

So we said, give us a second opinion. We want to be sure you are getting a second opinion within the Pentagon yourself. Again you read a national publication in which a major general says this group constitutes an internal threat to the military.

As chairman of the Sea Power Subcommittee and Force Projection Subcommittee, questions have been raised about a CX transport plane. The basis for the rationale for the CX is that our planes now are so big, and consequently, they need longer runways. You have to have a plan to land on a shorter runway.

As a layman, I might ask, could you extend some of the runways we want to run on. Couldn't we have Sea Bees, or something possibly to lay down a grid system to extend the runway in a time of crisis? The answer is no, it is not feasible and that is the end of it.

We are locked into buying the CX. Then I find myself listed in a magazine that says, "Cohen is opposed to the CX, thereby, depreciating our strategic capability." Unfortunately, the implication is that I am unpatriotic.

It is not a question of manhood so much as it is a question of patriotism. Unless we are prepared to deal with that, we can go through all the motions and, as you suggest, all the Circular A-109's, and it is not going to change anything. It is going to get wrapped up in the whole issue of whether you are for Defense—it is not a question of how much you should spend on defense but how you should spend it and where you should spend. This seems to me to be the questions we in Congress ought to be asking.

To come back to your suggestion, we should take one weapon system that has been a success, find out why it has been a success and follow it.

I could not help but note Senator Pryor in his opening statement held up a list of paid ads in the Washington Post. There is one from my friend Bath Iron Works. I am going to say there is a success story.

Senator **Pryor**. There is a good contractor.

Senator **Cohen**. Bath Iron Works is the only shipbuilding company in the United States that not only builds on time but ahead of time, and not at the cost but lower than the cost.

My suggestion is, Senator Pryor, that we take and build all our weapons systems at Bath Iron Works and put the B-1 bomber and all the others coming on line and find out why they are so successful in achieving these cost reductions and put them in Bath, Maine.

Senator **Pryor**. Let me respond, if I might. I did not want to embarrass my friend holding up ads from Maine. One of my main points about these ads was they go to the mentality and the psychology that we have today. I have a fear and strong suspicion, I think I can prove it eventually, that all these ads are being paid for by the taxpayer eventually. They are built into the cost of those bids.

One of the major firms I know of, in the early stages I believe, of the B-1 in 1974, 1975, attempted to charge some $4,000 to $5,000 in public relations expense to their government contracts—and so billed to the taxpayer.

I imagine that bill was paid. I don't know the outcome.

I think these, without question, are paid for by the taxpayer eventually. Once again, I have no reference to any one particular company or contractor. I could have brought 100 of them, as we have seen from various companies and organizations.

Mr. LYNN. If I may make an observation, though, perhaps to counter the gloom I seem to be spreading. I think it wasn't too long ago when I was first going to work in the Defense Department, I think it would be unheard of that a committee of the Congress would be asking questions of the kind you are asking and making the kind of inquiry you are making. At the time it was controversial for me, a person like myself, to be in the Pentagon. Now I am appearing before a congressional committee. I think there is more openness and more debate and discussion, and the ad is really an example of that, it is being brought to the public's attention. It is much more out in the open than it used to be. There is CBO, Brookings, AEI, and universities. A much wider base of discussion now, much more respectable. Even though it seems threatening, people persist in discussing these things. I think that is an opportunity that can be taken advantage of.

Senator PRYOR. Dr. Lynn, I also was going to ask my colleague and friend from Maine that if maybe the Bath Iron Works is so efficient, maybe they would like to manufacture nerve gas and make it in Maine.

Senator COHEN. As long as we can put it in Arkansas, sure.

Chairman ROTH. Thank you very much, Dr. Lynn, for being with us here today. We all appreciate that.

[Dr. Lynn's prepared statement with an attachment entitled, "Controlling Military Costs and Capabilities: Can the Secretary of Defense Make a Difference," follow:]

STATEMENT OF
LAURENCE E. LYNN, JR.
PROFESSOR OF PUBLIC POLICY
JOHN F. KENNEDY SCHOOL OF GOVERNMENT
HARVARD UNIVERSITY
BEFORE THE SENATE COMMITTEE ON GOVERNMENTAL AFFAIRS
October 21, 1981

Mr. Chairman and members of the Committee,

There is widespread agreement that major reforms are needed in the way the Department of Defense develops and buys weapons systems. Liberals and conservatives, Republicans and Democrats, hawks and doves, civilian experts and military men have complained of DOD's tendency to produce overly complex, excessively costly weapons which perform poorly in the hands of troops. These same critics also recognize the inertia in the organizations which produce these weapons. Managing weapons acquisition in order to achieve the desired reforms, then, is probably the most difficult management problem facing any American executive, public or private.

While the problems plaguing the weapons acquisition process have been well documented, far too little attention has been paid to how they can be avoided or overcome. The central message of my testimony, Mr. Chairman, is that the Congress and its agencies, the Executive Branch, and experts outside of government must increase their concern for improving the management of the defense establishment, including more effective exercise of Congressional oversight.

No study of defense management will fail to identify the pivotal role played by the Secretary of Defense and by those officials he appoints to assist him in supervising weapons acquisition. If these officials are ineffective, reform is impossible. For them to be effective, at least four conditions are necessary. The Secretary of Defense and his management team:

- must have a clear and concrete idea as to what they hope to accomplish;
- must acquire a good intuitive understanding of the kinds of problems that have affected weapons design, development and procurement and their causes;
- must have the ability to manage a large, complex organization; and
- must have the support of the President and key committees of the Congress.

Unfortunately, even if most of these conditions are present--and I will comment on the current situation later in my testimony--there are severe limits on what the Secretary of Defense can accomplish, at least if postwar experience is any guide. With a colleague, I recently completed an examination of the achievements of Secretaries Robert S. McNamara and Melvin R. Laird in influencing the costs and capabilities of U.S. military forces. Determining whether a particular official has altered the course of the defense establishment requires judgments, admittedly speculative, as to what would have happened otherwise. In general, answers should emerge from applying tests such as the following:

--Did missions and weapons traditionally accorded low priority by the services enjoy higher priority and vice versa while a particular official held office?

--Did interservice coordination and joint planning increase?

--Did those unambiguously expressed views and decisions of key leaders that went against the grain of service preferences get systematically implemented?

--Did serious proposals originating outside the regular weapons acquisition process get full consideration within DOD and were they ever adopted and implemented?

McNamara's attempts to assume greater control over force planning and budget allocations had several types of influences on the U.S. military posture.

--He raised some priorities and lowered others; airlift and sealfit, air mobility for combat forces, and air superiority and combat support missions for tactical aircraft were accorded higher priority, whereas, investments in strategic bombers were reduced.

--He improved coordination in planning; better coordination was introduced into stratgic mobility and strategic nuclear force developments, and the Air Force was induced to accept a tactical aircraft, the F-4, developed by another service.

Apart from these changes, however, the force structure and its capabilities were probably not appreciably affected by McNamara's management reforms. Even the changes just mentioned were attenuated: the C-5A became a troubled airplane, the FDL force was never procured, the F-15 was a smaller departure from precedent than had been hoped, heavy investments in traditional strategic bomber concepts continued. The McNamara revolution was in some respects one of style rather than one of substance.

Apart from countless adjustments to appropriation line items, program schedules, and the like--which, incidentally, any DOD administration can be expected to affect--the influence of Laird and Packard appears to have been in the pressure they exerted toward the procurement of lower cost weapons systems. Their legacies are the F-16 and the A-10, both subject to a prototype stage insisted upon by Packard, and the retrofitting of Poseidon submaries with Trident I missiles. The constraints on their influence, as was the case with McNamara, is revealed in numerous failures to alter service priorities and in the price paid for these limited gains: continued support for most of the expensive, high-mix weapons favored by the services.

The management approaches of McNamara and Laird were notably different. McNamara sought to use control over the force structure and associated budget allocations together with careful analysis of military requirements to influence military capabilities. In contrast, Laird preferred to exert his influence through establishing budget ceilings, issuing general policy guidance, and intervening selectively in shaping weapons proposals, leaving the analysis of military requirements to the services and detailed budgetary allocations to the comptrollers in the services, OSD, and OMB. What is striking in both cases is that the general contours of their management approaches mattered far less to the results each achieved than their personal efforts to influence specific decisions. In the end, both accomplished similar results. Both succeeded in exercising limited influence over weapons design, procurement and performance through becoming involved, either themselves or through their deputies and assistants, in individual weapons projects. Moreover, both became involved in these projects for similar reasons: the unacceptably high unit costs and inappropriate designs incorporated in weapons proposals emerging from the services. Through their interventions in specific projects, both were able to exert limited influence over force planning priorities, though McNamara was somewhat more successful in this regard.

Why weren't these two capable officials able to accomplish more? The explanation is to be found in the character of the weapons acquisition process. This process is characterized by its decentralization, technical and programmatic complexity, and the dominance and relative inflexibility of service and research and engineering bureaucracies. Lurking behind every major weapon proposal are assumptions about the kind of combat capability that is required. These assumptions are typically made early in the development process, at levels well below the scrutiny of top departmental officials. They may or may not reflect sound judgment concerning the kinds of capability that will best serve our interests. By the time Congressional and executive branch officials become aware of such assumptions, they have been hardened into concrete weapons system proposals that have achieved considerable momentum. Though the underlying assumptions are the determinants of future weapons system costs and performance, they are seldom debated. If it is assumed, for example, that the basic Air Force fighter/bomber must be able to fly from bases in rear areas to targets deep in Germany at night and in bad weather, and if it is further assumed that they must be able to identify and destroy high-speed Soviet fighters beyond visual range, then a highly complex, extremely expensive aircraft will be "required" and that is the kind of weapon system that the Secretary of Defense and the Congress will be asked to approve. Civilian officials may pale at the cost and be skeptical of the need, but the time at which they might usefully have questioned the basic assumptions has long since passed. Instead of a well-informed debate over the kind of capability that is needed, there will be a head-on clash between skeptical but inexpert civilians and the nation's senior military leaders backed by their contractors. It is an unequal struggle.

Virtually all administrations have confronted the problem of costly, poorly performing weapons of dubious merit, and they have devised numerous management tools in an attempt to overcome it. These methods have been designed to bring underlying assumptions to light for discussion before service and contractor positions have hardened, or to insure operational testing of basic weapons concepts so that problems are identified before commitment to procurement, or to use cost ceilings and profit incentives to enforce design discipline on the services and the contractors. Without going into detail, it is worth mentioning a few of these methods.

--McNamara experimented with two approaches: total package procurement, designed to provide the contractor with incentives to keep costs under control, and the Development Concept Paper, the purpose of which was to insure adequate discussion of the design philosophy and technological uncertainties associated with specific weapons projects.

--Laird and his Deputy David Packard instituted a "fly-before-you-buy" policy to insure operational testing before a commitment to procurement, and they created the Defense Systems Acquisition Review Council (DSARC), with a purpose similar to McNamara's Development Concept Paper.

--In 1976, the Office of Management and Budget promulgated Circular A-109 to insure mission area analysis in the early stages of acquisition and more competition throughout the process. Its implementation by Secretaries of Defense has

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been inhibited by contractor and service opposition, much of it merited.

--Secretary of Defense Harold Brown created an Office of Testing and Evaluation to separate the analysis of operational test results from the personnel responsible for research and engineering to insure completely independent evaluation, but later the office was virtually abolished by a Brown subordinate, an apparent victim of bureaucratic politics.

In short, Mr. Chairman, many have tried but few have succeeded in reforming the weapons acquisition process.

The current administration, too, is determined to reform the way we buy weapons. But whereas previous administrations have sought to tighten the Secretary's control over key aspects of the process, Secretary Weinberger and Deputy Secretary Carlucci are implementing what they call "controlled decentralization," whereby subordinate line executives, especially service program managers, will be held accountable for execution of policy decisions reached by the Secretary after consultation with his top civilian and military subordinates. They are acting out of the conviction that problems of cost overruns and hardware that performs poorly and is difficult to maintain were made worse by previous attempts at detailed, centralized control, especially by DOD's civilian research and engineering community.

Perhaps. There can be no question that among the results of previous attempts at managing weapons acquisition have been complexity, confusion, and delay in decision-making. But, as with these previous attempts, the proof of the administration's claims will be in the execution, in the results achieved. Here, substantial skepticism is warranted. We have tried leaving the management of weapons acquisition to the services before, in the 1950s, and the results led to the first major critical study of weapons costs and performance, to the creation of the very Office of Defense Research and Engineering that the administration cites as a villain, and to President Eisenhower's famous warning of the dangers posed by the military-industrial complex. Moreover, those were times when DOD faced relative resource scarcity. With the great increase in spending for procurement in prospect, the potential for abuse now seems much greater.

My personal view is that the administration's approach to managing weapons acquisition, outlined in Deputy Secretary Carlucci's memorandum of April 30, 1981, is naive concerning the realities of the weapons acquisition process and the sources of the problems with it. I expect to see in the next few years an increasing involvement of the committees of Congress in oversight of weapons acquisition management as problems multiply.

In the meantime, I believe we need to know a great deal more than we now do about this most perplexing of management problems. Administration officials have said that the subject has been studied to death. I would have more confidence in this judgment if recent history were different, if we had not witnessed successive Secretaries casting about in frustration for ways to control a process that remains stubbornly resistant to change. I believe that this committee would be performing a great service if it could satisfy itself as to what we know and what we don't know about how the leaders of the Department of Defense can effectively influence what weapons we buy, what we pay for them, and what we get in return. I can think of no more important contribution to good public management.

DRAFT
10/26/81

CONTROLLING MILITARY COSTS AND CAPABILITIES: CAN THE SECRETARY OF DEFENSE MAKE A DIFFERENCE?

by Laurence E. Lynn, Jr., and Richard I. Smith

Like John F. Kennedy and Richard M. Nixon, Ronald Reagan assumed office having vowed to further increase defense spending and strengthen America's military posture. Like Kennedy but unlike Nixon, Reagan could look forward to cooperation from the Congress and general public support for his defense initiatives. Though procurement, research and development had been increasing in recent years, numerous weapons development and procurement proposals accumulated during the preceding decade were awaiting Reagan's go-ahead. The stage was set for President Reagan to deliver on promises made by candidate Reagan.

The issue would not be quite that simple, however. The President's determination to balance the budget and stop inflation in large measure by reducing social spending began producing congressional defections from the administration's defense spending plans, and more are sure to occur when heavy outyear defense obligations come due. A more serious problem for the administration looms, however. The administration confronts the Pentagon's propensity, deeply ingrained over three decades, to buy weapons of steadily higher unit costs and increasing complexity, propensities well documented by recent critics of the weapons acquisition process. To increase defense spending without correcting these underlying propensities will, these critics argue, be wasteful and dangerous. Because their arguments have won a sympathetic audience among thoughtful legislators of both parties, the issue of weapons costs and performance could prove embarrassing to the economy-minded Reagan administration and insure deepening involvement by congressional committees in defense management.

Other administrations have confronted this same problem of high cost and poorly performing weapons. A major impetus to the desire of Robert S. McNamara and of most subsequent defense secretaries to keep the management of weapons acquisition in their grip was out-of-control weapons costs and the unbearable pressure they put on the defense budget. McNamara tried total package procurement and the development concept paper. Melvin Laird and his deputy David Packard initiated a "fly-before-you-buy" policy and created the Defense Systems Acquisition Review Council. The results have been mixed at best, the most apparent ones being, unfortunately, complexity, confusion and delay in decision-making.

Indeed, many critics of the weapons acquisition process are identifying the very management approaches that were designed to control costs and performance as the source of recent problems. Echoing many of them, James Fallows, in his book National Defense, argues that "managerial minds" and "managerial logic" are the root cause of poorly designed, excessively costly weapons. Substituting the abstract logic of cost-effectiveness for common sense and experience acquired in combat, he believes, guarantees an ineffective military posture. In apparent sympathy with this perspective, Reagan's Secretary and Deputy Secretary of Defense, Caspar W. Weinberger and Frank C. Carlucci, have promised to decentralize defense management, leaving it up to the Army, Navy, and the Air Force to manage their organizations and the resources under their control, while top civilian officials concentrate on financial management and overall strategy.

This critique of previous defense management, and the Reagan administration's apparent sympathy with it, raises an important issue. Are critics correct in identifying the managerial thinking and centralized decision-making of Defense Secretaries such as McNamara, Laird, James R. Schlesinger, and Harold Brown as the cause of current weapons acquisition problems? What kind of management would produce a different, and more satisfactory outcome?

In the following sections, we assess the evidence from two recent periods --those when McNamara and Laird served as Secretaries of Defense--to determine how the management approaches of these two officials affected the development of the U.S. military posture. The question we address is, What influence did these two officials exercise over U.S. military forces, capabilities, and costs? Determining whether a particular official has altered the course of the defense establishment requires judgments, admittedly speculative, as to what would have happened if the bureaucratic and political focus originating in the services and Congress were allowed to operate without interference. In particular, we have searched available accounts of the McNamara and Laird administrations seeking answers to the following questions:

--Did missions and weapons traditionally accorded low priority by the services enjoy higher priority and vice versa while a particular official held office?

--Did interservice coordination and joint planning increase?

--Did those unambiguously expressed views and decisions of key leaders that went against the grain of service preferences get systematically implemented?

--Did serious proposals originating outside the regular weapons acquisition process get full consideration within DoD and were they ever adopted and implemented?

The concluding section summarizes the lessons of their experience for current and future defense leaders. What kind of leadership might succeed where other approaches have failed in changing organizational behavior that had become ingrained over three decades? Can the Secretary of Defense affect the weapons acquisition process at all? Are either more or less stringent procurement regulations or any other kind of organizational devices likely to affect the costliness and performance of U.S. military forces?

II

Creating appropriate and ready defense capabilities at an affordable cost requires several different types of decisions by senior national security officials. Judgments are required concerning basic national security policy and strategy, i.e., the basic assumptions concerning the outbreak and conduct of war to be used in force planning; the size of defense budgets and their allocation among services, weapons systems, and functional categories of expenditures; and operational design testing, training, basing, and employment of our forces. Postwar debates over organizing the national security establishment and the Department of Defense have been over the allocation of authority of influence over these decisions.

During the Eisenhower era, for example, authority over basic national security policy and over the defense budget, both the total and its allocation among the services, rested more or less securely in the Executive Office of the President, with considerable influence exercised by the Secretary of State and the Secretary of the Treasury. The essence of the changes in this area introduced by John F. Kennedy and McNamara was delegation of primary influence over these basic decisions to the Secretary of Defense. Though

Nixon and his national security advisor Henry A. Kissinger partially reclaimed authority over basic national security policy questions, all defense secretaries since McNamara have had the opportunity to dominate military policy, program and budget choices.

The allocation of authoirty over basic policy and budget questions, while significant, may not be the heart of controlling the costliness and performance of our military forces, however. Experience suggests that the three most decisive processes in this regard are internal to DoD: the detailed preparation of the budget, the design and development of weapons systems, and the acquisition of--contracting for--weapons. Control of these three processes is sine qua non to controlling actual defense capabilities over the long run. Yet, lavish and esoteric detail characterizes each of these processes. And the Secretary of Defense has attained a secure measure of control only over budgeting. Weapons acquisition is highly decentralized to the services, thus making control by civilian leaders exceptionally difficult to exercise. Therein lies the challenge to the Secretary's ability to shape the U.S. military posture.

Recognition of just these problems underlay the creation of the Directorate of Defense Research and Engineering (DDRE) in 1958 (now the Office of the Undersecretary for Research and Engineering) and the Office of Systems Analysis in 1961 (now the Office of Program Analysis and Evaluation). Research and Engineering has the responsibility "for the acquisition of all weapon systems of the Department of Defense including their research, development, testing, and Procurement." Thus, the office in principle gives the Secretary of Defense substantial access to, if not control over, the research and development agendas of the services as well as over the procurement process and thus considerable early influence over the alternatives to be developed. The Systems Analysis (now Program Analysis and Evaluation) Office was created to provide the Secretary with an independent, DoD-wide perspective on forces, budgets, and strategies, i.e., on the choices of alternatives, their costs, and their effectiveness. A major theme of defense management throughout the period has been that competition among the services for budgets and missions would stimulate active thinking and incentives toward efficiency.

Creating these offices and assigning them a major managerial role clearly did not do the trick. The question is, Why not? The answer is that what any organizational apparatus can accomplish depends on a host of factors not reflected on organization charts. How much do the interests of the services in fact overlap and, therefore, how much actual or latent competition is there among them? How divergent are the priorities of the services and of the other offices and agencies within DoD? How committed are the services to particular ideas and proposals, and how intensely will they oppose decisions unfavorable to them? Of obvious importance are the personalities, interests, and competences of officials holding influential positions. They may have authority but be incapable of exercising it effectively. Reorganizing the allocation of authority within the Defense Department may or may not have any real effect on defense capabilities depending on the strength of these factors and the effectiveness of defense officials in recognizing and coping with them.

III

The Planning, Programming, Budgeting System (PPBS) was introduced to the Pentagon by Robert McNamara in response to widely perceived deficiencies in the Eisenhower Administration's budgeting and planning processes.

In the late 1950s, the impression was widespread that the civilian Secretariat of DoD had abdicated to the services control over force structure and weapons acquisition decisions by allowing them to allocate resources within predetermined budget ceilings. The force structure emerged "as the result of bargains struck by three competing services more concerned with promoting their own parochial interests than producing a coherent military strategy and force structure."[1] Budgeting within service ceilings also yielded a structure of internal incentives that was not necessarily rational. For example, the Army tended to view its Anti-Ballistic Missile (ABM) program as a competitor for funds with its own combat forces, not with Air Force and Navy strategic nuclear forces.[2] Moreover, because there was little or no forward planning, the services could conceal future budgetary costs in winning approval to initiate a program.

In theory, PPBS would alter these incentives by imposing a DoD-wide multiyear perspective on the services' program choices and insuring that the Secretary of Defense and his staff could weigh alternatives, rather than merely ratify the services' choices. In practice, however, PPBS consisted of complex processes that often diverged from its theory and subverted its intentions.[3] For example, though in theory the budget was to be a product of careful analysis of what was needed and how it could be obtained efficiently, a budget ceiling known to the Secretary and his key aides was established well in advance of the budgeting stage. Unlike the Eisenhower era, however, in which the Director of the Bureau of the Budget and Secretary of the Treasury set the defense total, Presidents Kennedy and Johnson gave the Secretary of Defense unprecedented influence over the size of DoD budget.

Since the services were instructed to submit program proposals to OSD without regard to their total cost--on the theory that whatever America really needed, America could afford--many program decisions were postponed until the budget review so that the budget ceiling could be met. Decisions, especially controversial ones, were also postponed to avoid having to make them again and again in response to service appeals. The "budget-cutting rules" employed in the Comptrollers's Office were based on the intuition and experience of budget examiners (who had served throughout the two previous administrations and were oriented toward congressional appropriation categories), not on the analysis McNamara preferred. During the budget review, the level of funding for many OSD-approved programs was reduced, or entire programs were eliminated, so that ceilings on each appropriations category could be met. In addition, 25-40% of the budget, mostly fixed support costs, was never put in program format and was arbitrarily assigned to the cost of particular weapons or activities by the Comptroller's Office. This practice, combined with ambiguities in the program structure and the imprecise character of OSD responses to service proposals, made it difficult for the services to determine exactly what decisions had been made by OSD. It also gave them considerable freedom in allocating resources after the budget was complete.[4]

Despite these considerations, the force structure was definitely influenced by McNamara's new management approach, mainly through the agency of the Systems Analysis office (OSA), the innovative staff element set up to bring rigorous, impartial analysis to bear on major force structure and weapons acquisition decisions. Neither the Comptroller nor the Secretary was interested in cutting the Defense total below its ceiling.[5] It was the systems analysts who explored force structure and weapons program issues and wrote most of the documents justifying McNamara's decisions. Thus, the McNamara-approved baseline forces contained in the service budget submissions, over which the Office of Systems Analysis exercised primary influence, set the agenda for the Comptroller's review. OSA seemed to be effective in influencing the numbers and, particularly, the types of weapons procured during McNamara's tenure when it (a) supported the position of an existing faction within a service, (b) advocated the use of a capability that already existed and did not have to be developed, or (c) attempted to prevent rather than initiate action. Only in aberrent cases did OSD manage to take the initiative and/or force an unpopular program through a renitent service bureaucracy.

IV

Though OSD was responsible for approving the weapons procured by the services, the services established the detailed requirements for new weapons. These requirements tended to reflect the preferences of both the user commands, e.g., the Tactical Air Command (TAC) or the Strategic Air Command (SAC) in the Air Force, and the technically-oriented systems commands. Only in rare cases were other offices or agencies, particularly those oustside of regular service channels, regularly included in formulating requirements. Moreover, requirements were generally presented to the Secretary in the form of yes or no choices, e.g., an aircraft or ship of fixed specifications, rather than options. OSD review might have led to modification or rejection of a proposal, "But it [was] no accident that OSD's elaborate analyses often conclude[d] that the right thing to do [was] precisely what a service [had] proposed."[6] There was no other channel by which weapons systems proposals could be developed and approved. In rare cases--the C-5A, Fast Deployment Logistics ships (FDLs), and the F-15 are examples--OSA became deeply involved in generating requirements, but even in these cases their influence was primarily conceptual. Although McNamara attempted to reform the requirements generation process in the late 1960s through a device called the Development Concept Paper, the reforms were aimed at making it harder for the services to justify new and "gold-plated" systems, not at taking the basic responsibility for weapons design away from them.

The inventors of PPBS had hoped that interservice competition would have the effect of creating design options. However, duplication of function among the services is not extensive. Even where it does exist, it will not necessarily create a rivalry that would force information and options to the Secretary's attention if the duplicated function is not part of one service's "essence," or self-defined primary mission.[7] Each service's essence will tend to limit the options it is organizationally capable of producing. For example, throughout the 1950s and 1960s, the Air Force was able to generate several different ways to deliver nuclear weapons on targets in the Soviet Union, but other missions were virtually ignored. For example, the F-105, designed as the fighter for the 1960s, had virtually no conventional capability. Indeed, over time, bureaucratic politics tend to minimize duplication of function as the various factions reach territorial accommodations. The practical consequences of this situation under McNamara were that, in general, weapons and concepts that did not fit with service priorities either did not come to OSA's attention or, when they did from another source, such as a contractor or a think tank, OSA could rarely persuade the services to take an interest in them.

Even when competing programs, existed, the service and congressional support each had developed severely restricted the ability of civilian managers to exploit the overlap. Perhaps the best example of overlapping service missions was found in strategic nuclear programs. The principal competitors were the Air Force's Minuteman missile, B-52 and B-70 penetrating bombers, Skybolt air-launched ballistic missile, Hound Dog air-to-surface missile, and the Navy's Polaris Submarine-launched ballistic missiles and carrier-based forces. By 1961, none of these, with the exceptions of the B-52 and carrier aircraft, were far along in deployment, and many were still in the development stage. In early 1961, OSD officials concluded that ". . . there was no coherent pattern or plan for deciding how much of which system we should retain or buy."[8] Their examination of the force structure built on earlier studies that emphasized survivability as the key characteristic in strategic weapons, thus focusing attention on Minuteman and Polaris as the most survivable and cost-effective systems.[9]

McNamara's decision on the number of strategic weapons to be procured was heavily influenced by the missile gap charges of the preceding presidential campaign and the political support that had already developed for each competing program.

> The political backing the proponents had obtained for Polaris was sufficient to prevent . . . McNamara from doing anything more with the Navy's . . . fleet objective, when it was presented to him for review, than removing . . . four extra submarines. The Secretary made no attempt to calculate independently the optimum size of the . . . fleet by comparing the advantages of the Polaris system with those of alternative strategic systems. The number 41 was a product of the convictions of Polaris proponents and the realities of politics.[10]

One thousand Minuteman missiles was apparently the minimum number McNamara thought he could buy while retaining the support of the Air Force and Joint Chiefs. Thus these forces and numbers became the Secretary's force structure objectives. It is hard to imagine that another Secretary would have enforced different decisions.

Other decisions followed a similar pattern: if an idea had gathered momentum, even if only in the development stage, it was hard to kill or deflect. For example, OSA's analyses, building on findings from RAND Corporation studies, persuaded McNamara that bombers were vulnerable to attack and less cost-effective in the strategic role than other systems. With B-52 procurement nearing completion, the Air Force had begun to develop its successor for the 1970s, the B-70. In light of the competition ballistic missiles posed for the manned penetrating bomber, the B-70 had become the Air Force's highest priority and had gained strong congressional support. In FY1960, the Eisenhower Administration had virtually deleted the B-70 from the budget, but funds were restored a year later to fend off election-year charges that the Administration was soft on defense. To delete the program from his first budget--and to keep it out of subsequent budgets--McNamara had to pay a high political and budgetary price. An additional several hundred million dollars was invested in prototypes of a thinly disguised version of the plane, the programmed number of B-52s was increased, and the Skybolt air-launched ballistic missile, using the B-52 as its platform, which had been all but killed by the Eisenhower Administration due to technical problems and cost-overruns,[11] was revived to insure a continuing role for the B-52s by giving it stand-off and defense suppression capabilities.

The TFX is an example of a conventional weapon for which service commitments limited the opportunity to develop "analytically correct" choices. McNamara forced the Air Force and the Navy into joint development of the TFX and simultaneously ended the Navy's F-6 program on the recommendation of DDRE. Strong support of the TFX by DDRE and the Navy's strong support of the F-6 overwhelmed the consideration of aircraft design alternatives that were perhaps better suited to the mission but lacked organizational sponsorship.[12] In deciding to end the Navy's development of the F-6 fleet defense fighter in favor of a joint Air Force-Navy fighter, McNamara rejected the informally offered advice of his systems analysts and followed the course begun under Eisenhower. Cancellation of the F-6 proved a hollow victory for McNamara, however, and the TFX episode reveals the limits of the Secretary's ability to change the course of weapons developments.

Throughout the course of the plane's development, both services refused to compromise any of their performance requirements, which in many cases were in conflict. For example, whereas the Navy envisioned a plane with subsonic speed, making it small enough for carrier landings, the Air Force insisted on a plane capable of carrying out supersonic nuclear missions. Despite the "inordinate amount of . . . personal time and influence [McNamara spent] trying to salvage his original ambition," joint TFX development was doomed.[13] In the end, the TFX was unsuitable as either a limited war fighter for the Air Force or a fleet defense plane for the Navy. The Air Force procured a limited number, the Navy dropped out of the project altogether, and both services developed and procured new fighters independently.

Another example of how the Secretary was constrained by service inertia is found in the Navy's approach to designing ships. According to former Chief of Naval Operations Elmo Zumwalt,

> The [Navy's] sea-control mission . . . requires a large number of platforms from which weapons can be fired and planes launched, a large number of ships. In most cases seven or five or even three ships of moderate capability would contribute far more to the success of this mission

> [than one high-capability and very costly ship would], as a series of analyses ordered by Robert McNamara . . . decisively demonstrated.[14]

Out of these analyses the "High-Low Mix" concept was formed. According to this concept a small number of highly capable ships would perform the limited number of missions that must be carried out in a high-threat environment. For less demanding missions, a larger number of moderately capable and more affordable ships would be procured. Despite McNamara's early advocacy of the High-Low Mix as a way to cope with limited ship construction funds, when Zumwalt became Chief of Naval Operations in 1970, he found that there "was more than enough High [mix ships], more than enough Too High, already under construction or under contract . . . and almost no Low [mix] at all." The SSN-688 class of nuclear-powered attack submarine ("too sophisticated, too expensive") was being built, as were high mix nuclear-propelled carriers and cruisers, destroyers, and amphibious ships. In fact, there were no low mix ships even on the drawing board.[15] The new class of destroyers, DD-963, for example, had been an object of special attention for Secretary of the Navy Paul Nitze. When design began on the successor to a previous class destroyer, which had been one of the few breakthroughs for low mix advocates and a successful performer, Nitze pushed hard for only incremental improvements. Although he fired two admirals who resisted his approach, the Navy managed to build the DD-963 as an expensive high-mix ship.[16]

The Defense Secretary's ability to shape the force structure by vetoing program proposals or suggesting alternatives is thus limited. Each time an action was blocked, the affected service was able to mitigate the effects by pursuing its objectives in other ways, e.g., the transmutation of the Navy's TFX into the F-14. They were able to do so because of their general control over the weapons acquisition process and their relative mastery of the details of budget preparation.

V

Despite the constraints on McNamara's ability to influence actions, he did achieve several successes. Perhaps the single greatest is represented by the Air Force's procurement of the Navy-developed F-4 as its basic fighter for the 1960s. Early in McNamara's tenure, the Systems Analysis Office sought ways to increase the conventional capability of the Air Force's tactical aircraft. The F-105, then in the early stages of procurement, was built for strategic interdiction, and had almost no conventional capability. To remedy this disadvantage, McNamara took OSA's suggestion and ordered that "hard points" be attached to the plane's wings to enable it to carry conventional bombs. The Air Force could do little to avoid implementing the order, and probably had some incentive to comply since the addition of hard points would not itself degrade the plane's nuclear interdiction capability. Their acceptance of this small compromise would satisfy the Secretary, perhaps preempting more drastic changes. Even if a conventional capability were added, field commanders could choose to withhold the plane from conventional missions if combat threatened to escalate to a nuclear exchange.

OSA continued its search for an alternative to the F-105 and quickly fixed upon the Navy's F-4. Designed primarily for fleet defense, it was capable of performing the non-nuclear strike missions of the Air Force. The F-4 also had greater dog-fighting and close support capabilities than the F-105. In 1962, after a year of discussion between the Air Force and OSA in which OSA tried to convince the Air Force to buy the F-4 and the Air Force insisted on the F-105, McNamara cancelled the F-105. The Air Force, given the choice of buying the F-4 or perhaps no plane at all, bought the F-4 and eventually became an enthusiastic supporter of it.[17]

Close cooperation between OSA and one faction of the Army led to the formation of the 1st Air Cavalry Division, which would employ helicopters to provide air mobility for infantry. Developed with the full support of OSA, the concept of an airmobile division had been suppressed by the Army, mainly because it challenged the necessity for some of the Army's traditional missions and forces. In addition, "the testing, evaluation and speedy introduction of an airmobile division into the force structure [had] received the strong and energetic support of the Secretary of Defense."

> In the spring of 1962, Secretary McNamara sent the Secretary of the Army two memorandums [drafted by OSA] directing him to reexamine in detail the Army's qualitative and quantitative requirements for aviation. The Secretary had felt that the Army had failed to exploit opportunities to improve tactical mobility through the greater, more imaginative use of aviation. Before these memorandums were sent, Army officers who supported the airmobile concept were having a very difficult time getting their ideas heard. These memorandums gave them the charter they needed to bring their ideas to the attention of top officials in the Defense Department, where they got . . . prompt action . . . .[18]

The first memorandum revealed the Secretary's predispositions, but the resulting Army study rejected upgrading the Army's aviation capabilities in favor of acquiring traditional land mobility vehicles. The second memorandum virtually ordered the Army to produce certain answers, and listed by name the officers and civilians who were to conduct the study. All had been involved in developing or were sympathetic to the airmobile concept. The results of the second study favored the establishment of an Army air transport capability and led to the formation of the 1st Air Cavalry Division.

A partial success began with the demise of the F-111 (formerly the TFX), which created the opportunity for the Air Force to design a new fighter. Beginning in 1962, a group of Air Force and Navy officers, along with members of the aviation industry, had been joined in a loose coalition informally known as the "Air Superiority Society." This group seriously questioned the prevailing approach to designing tactical aircraft, which emphasized the deep-interdiction mission. This approach had led the Air Force to build large, fast planes that were not highly maneuverable. To achieve air superiority these planes relied on air-to-air missiles rather than on the ability of pilots to down enemy planes in dogfights. Members of the Air Superiority Society questioned the effectiveness of air-to-air missiles and doubted the validity of the dominant Air Force belief that the days of dogfighting were over. They aggressively advanced their position, gaining the backing of the Systems Analysis office, which was also concerned about the extraordinary unit costs of "multi-mission" planes. Over time OSA also developed increasingly strong doubts about the value of deep-interdiction and came to favor aircraft built for close ground support and dogfighting.[19]

In Vietnam, dogfighting received a boost because of rules specifying visual identification prior to engagement of the enemy, and missile-launching planes such as the F-4 and F-111 proved to be relatively ineffective against the smaller, more maneuverable and much cheaper Soviet-built MiGs.[20] Despite this experience, when the Air Force began to design what was to become the F-15, it was to be a very large plane relying on air-to-air missiles for air superiority. Some Air Force officers who supported the original F-15 design appreciated the importance of a dogfighting capability, although they believed that the other capabilities provided by the F-15 were important, as well. Though a plane optimized for dogfighting would be much less costly, it would lack these other capabilities. Working together, the Air Superiority Society and OSA managed to reduce the F-15's size by one-third, increase its maneuverability, and reduce its unit cost. As a result, the F-15 cost less than one would project based on previous Air Force trends.[21]

Two cases demonstrate OSA initiatives in a low priority area that began without significant support from a service faction. These cases are OSA's efforts to have the Air Force develop and procure the C-5A cargo plane and the Navy to procure the Fast Deployment Logistics (FDL) ship. Had the Congress not prevented the Navy from procuring more than two FDLs, the C-5A and FDL would have been two of the few victories of considering in one package all systems that contribute to a single goal. Analysis showed that when operated in complementary roles, the C-5A and the FDL were the most cost-effective means to move fully-equipped forces rapidly into combat.

The impetus for both systems came from a series of studies done by OSA, which, beginning in 1961, first focused on ways to augment lift capacity and then moved on to develop a model to determine the optimum mix for given contingencies of airlift, sealift, and equipment prepositioned overseas. Simultaneously, studies ordered by McNamara and supervised by the Chairman of the Joint Chiefs of Staff confirmed long held speculations about the value of a rapid deployment strategy for shortening the length and reducing the cost of conventional wars.[22]

The FDL combined a ship and a concept. The ship was the Ro/Ro (roll-on/roll-off) ship developed by the Navy--three of which Congress had already authorized--which could be loaded with very large, fully assembled equipment. The concept, developed by OSA, was the Forward Floating Depot (FFD). Prepositioned overseas within a few days of potential trouble spots, the FFD was to store stocks of equipment and supplies in humidity-controlled cargo holds. By FY1963, three Victory class cargo ships had been converted to FFDs and deployed.

In 1963, technical breakthroughs in commercially designed Ro/Ro's made the FDL concept attractive and OSA began urging the Navy to purchase and test one of the new ships, but the Navy refused.[23] Sealift was a service the Navy ran mostly for the Army's benefit, and it feared that a large FDL program would eat into its warship budget.[24] In FY1966, McNamara inserted a request for the first four of a planned thrity FDLs in the Navy's budget. Attempting to allay Navy fears, he added funds for them above the amount the Navy would otherwise have received. "OSD's unusual ability to supercede service preferences on the issue lay in the simple fact that sealift was of minor importance to the Navy and a low-budget item. When OSD chose to include FDL in the Navy's budget (and to increase the budget by the amount of the required expenditure), the Navy did not bother to protest."[25]

The C-5A is interesting not because it increased airlift capability, but because of conceptual breakthroughs in the type of plane designed and the use it was built for. In May 1960, with the Eisenhower Administration still in office, Congress had approved an Air Force request for funds to develop a new long-range transport and for procurement of additional short-range transports. At its own initiative, Congress added funds for procurement of 100 off-the-shelf long-range transports. These moves to augment airlift capability were supported by the Army.* However, the new plane being developed by the Air Force, the C-141, was basically a conventional transport without the ability to move "outsize" cargo, such as fully assembled tanks or helicopters. This limited its ability to rapidly move fully-equipped Army divisions to scenes of conflict.

It was not until OSA broached the idea of rapid deployment of fully-equipped fighting forces that work began on a plane capable of such a mission. In December 1961, intrigued with the problem of moving fully-quipped combat units, OSA and aviation industry representatives began work on the C-141's successor. From these explorations, Boeing Company analysts came up with the first version of the C-5A.[26] The design caught hold not only within OSA but even within the Air Force, where airlift was usually regarded as a low priority. Once the concept of a very large plane had been developed, the Air Force recognized that it could put such planes to good use for itself, for example, as ferries for its fighters, as well as for the Army. Due to the Air Force's enthusiasm, which at times seems to have exceeded that of the OSA analysts, the concept was almost assured of a chance to prove itself.[27]

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*Thus, it is clear that regardless of McNamara's and OSA's influence, more airlift would have been acquired.

In summary, then, McNamara's attempts to assume greater control over force planning and budget allocations had several types of influences on the U.S. military posture.

--He raised some priorities and lowered others; airlift and sealift, air mobility for combat forces, and air superiority and combat support missions for tactical aircraft were accorded higher priority, whereas, investments in strategic bombers were reduced.

--He improved coordination in planning; better coordination was introduced into strategic mobility and strategic nuclear force developments, and the Air Force was induced to accept a tactical aircraft, the F-4, developed by another service.

Apart from these changes, however, the force structure and its capabilities were probably not appreciably affected by McNamara's management reforms. Even the changes just mentioned were attenuated: the C-5A became a troubled airplane, the FDL force was never procured, the F-15 was a smaller departure from precedent than had been hoped, heavy investments in traditional strategic bomber concepts continued. The McNamara revolution was in some respects one of style rather than one of substance.

VI

The inauguration of Richard Nixon and appointment of Melvin Laird as Secretary of Defense brought changes to the PPB system and a restructuring of the roles of non-DoD participants in developing the defense budget. Laird's objective was to adapt PPBS to his needs by insuring that programming decisions were made prior to the Comptroller's budget review (an unmet goal of McNamara's system) and by returning the formal initiative for programming to the services. Achievement of both goals was to be assisted by a return to the use of service budget ceilings. Early announcement of the ceilings would allow the services to program their forces to meet it. Within the ceiling, each service was to have considerable discretion in allocating its resources. A primary hope in the Secretary's office was that the services, knowing in advance what their budgetary allocations would be, would buy a larger number of less expensive aircraft and ships.

McNamara had maintained his control over the internal debate concerning forces and budgets by the early issuance of detailed statements, drafted in OSA, indicating in great detail the approved forces and programs and the rationale for them. In contrast, Laird issued policy and fiscal guidance cast in broad terms such as, "design forces to defend West Berlin for 60 days," or "include a development program for Y." Fiscal guidance specified budget authority and outlay totals for each service.[28] Within the Secretary's fiscal guidance, targets were set to protect selected programs which the services were prone to cut deeply to finance higher priority items or programs such as strategic offensive forces which the services felt they could force Congress to restore as add-ons to the budget total.

The role of the Systems Analysis Office was stipulated in a "treaty" signed by Deputy Secretary of Defense David Packard, the service Secretaries and the Chairman of the Joint Chiefs in April 1969, which stated that the Secretary would rely on the services and the JCS for designing the force structure. OSA was limited to evaluation and review of service proposals; it would no longer initiate its own proposals, though it could propose alternatives in response to service initiatives. In return, the services agreed to keep their budget requests within the ceilings established by the

Secretary.[29] McNamara and OSA had evaluated the services' proposals on their merits, thus creating strong antagonistic relations with the services. Laird usually based his decisions on more general policy, political and fiscal grounds perceived by the services and Congress as being legitimately within the purview of civilian officials.[30]

None of Laird's revisions to the PPBS appeared to have a decisive influence on the defense posture. One reform that met with limited success was the resurrection of OMB's role in shaping the defense budget. During Laird's tenure OMB gained access to the defense budget process several months earlier in the cycle and was able to influence DoD decisions[31] (though the purpose of the change was more to co-opt OMB than to increase its power). For example, James Schlesinger, OMB's National Security Director from 1969 to 1971, prodded the Navy to scrap several hundred older ships and shift the money which would have been used to operate them to new ship contruction.[32]

VII

Secretary Laird faced budgets that, in real terms, dropped below the average for the Eisenhower years, when no war was being funded. Civilian-military pay comparability and the All Volunteer Force greatly decreased the proportion of the budget available for procurement, while the costs of weapons were soaring. Though many factors drive cost growth, a 1971 RAND report found that adding and changing requirements to increase a weapon's system performance after it had been contracted for was the most important reason during the 1960s.[37] Such changes were often considered no more than "gold-plating."

Laird's strategy for handling these problems seems to have been to reduce force and procurement levels while laying the base for expansion and modernization of the force structure that could occur with a change in the domestic political environment. Accordingly, the share of budget authority devoted to strategic and general purpose forces dropped, those devoted to operations and maintenance held about constant, while the R&D share increased. In addition, Laird and Deputy Secretary David Packard urged the services to begin development of less expensive weapons.

It was this issue of high-mix vs. low-mix weapons that was the cause of most of the Laird administration's intervention in program decisions. In many instances OSD became as involved in development and procurement issues as it had been during McNamara's tenure but its attention was triggered by opportunities to develop less costly rather than more cost-effective systems. The F-16, for example, was developed in a fairly brief period and substituted for a larger buy of a higher cost plane, the F-15, allowing some expansion of TAC's force structure.

Despite the defense budget's shrinking buying powers the services' self-defined priorities continued to emphasize high-mix weapons. The legacy of systems left to Laird by McNamara and his short-lived successor Clark Clifford that were in advanced stages of development or just beginning procurement were almost all high-mix. Even the threat of cancellation did not move the Army to reorient the troubled MBT-70 tank program: though in 1969 Congress directed the Army to drop the program and develop an austere version, the Army essentially continued with the MBT-70 until Congress deleted funding for the austere version about a year later.[38] The services' key programs in the early and mid 1970s were the Trident missile and submarine, the F-14 and F-15 fighters, the B-1, and the AWACS.[39] The Aegis air defense cruiser, the XM-1 tank, which began as a fully redesigned austere successor to the MBT-70 but became increasingly costly, and continued procurement of the SSN-688 attack submarine could be added to this list.

That the Chiefs and services were successful in protecting these programs was in part due to Laird's influence, though their motives differed. His support of their high-mix preferences has been interpreted as "a way of easing lower cost weapons not pushed by the services into the U.S. force structure." According to Korb:

> [D]uring Laird's tenure, DOD never lost a critical vote in Congress. Laird was able to maintain all the essential weapons systems development programs while at the same time he allowed Congress to make substantial reduction in the defense budget . . . .[40]

Laird also refused to endorse the SALT I agreement until Congress voted to continue support of the key programs, some of which were in trouble.[41]

At the same time, a number of important exceptions to the high-mix emphasis were being developed. The success of OSD's low mix alternatives, as during the McNamara era, depended on the existence of some service support. Where such support was lacking, service control of the weapons acquisitions process undermined OSD efforts. The most successful exceptions to the high-mix rule are found in the Air Force's development of tactical planes. Under Laird both the F-16 and the A-10 ground support plane were developed. The F-16 was supported by the "Air Superiority Society" and was acquiesced in by the rest of the Air Force once the high-mix F-15 "was clearly in the procurement pipeline."[42] The Air Force accepted the A-10 as an add-on to the force structure and as replacement for aging A-7s, although they made it clear that they would not accept the plane in lieu of any fighters.[43]

OSD thus was able to capitalize on the difficulties in which TAC found itself. Although its budget did not take a prolonged and dramatic dip, what the budget would buy had. By the late 1960s, TAC was unable to sustain its inventory in the face of attrition. In Vietnam, the relatively poor dogfighting qualities of American fighters led to disappointing losses against less sophisticated and less expensive MiGs.[44] Although exchange ratios were favorable to the United States during most of the war, they were lower than the ratios achieved in previous wars and lower than would be expected on the basis of service claims for their planes and the cost difference between Soviet and American built aircraft.

The interests of OSD in developing a lower cost alternative to succeed the F-15 and refurbish TAC's declining inventory got support from the Air Superiority Society, whose proposed dogfighter was a relatively inexpensive aircraft. The A-10 is likely to have had the support of the Air Superiority Society since its addition to the inventory would reduce pressure to add a significant close-support capability to the F-16, which would have reduced the F-16's effectiveness as a dogfighter.

The F-16 and the A-10 went through the early stages of development outside of the Air Force's normal development and procurement bureaucracies, not only as a result of the Air Superiority Society's efforts (for the F-16) but because the Air Force was devoting most of its attention to the F-15. Once the planes reached the prototype stage, however, they were taken over by the Air Force's regular development bureaucracy. Both, particularly the F-16, were made more sophisticated during these later stages of development, though the number of changes was relatively small and the planes emerged as the recognizable progeny of their prototypes.[45] The addition of the prototype stage of the weapons acquisition process (a reform instituted by Packard) is credited with limiting the extent of expensive gold-plating possible on these planes.

OSD's efforts, supported in Congress, to persuade the Navy to adopt a less expensive fighter than the F-14 had very different results. Throughout its development, the F-14 experienced massive cost overruns and a difficult time in Congress. The Navy, however, was thoroughly committed to it as the F-4's replacement for the fleet defense mission. In 1971, Packard reduced the planned size of the F-14 buy from over 700 to 313. This reduction meant that the Navy would be unable to deploy a full complement of fighters aboard its carriers, and in August 1971, OSA proposed to Packard a low-cost, lightweight complement to the F-14. Some OSA analysts, skeptical of the capabilities of the long-range guided missiles the F-14 relied on for destroying enemy planes, saw an opportunity to add a dogfighting capability to the Navy's air squadrons. The Navy refused to accept their proposal, but eventually escalating costs and congressional pressures forced the Navy to agree to a smaller plane. Development of what became the F-18 enjoyed little support within the Navy, however. Unlike the Air Force which received almost all the F-15s it had requested, only about half of the Navy's F-14s were approved.[46] The result was that during development, the F-18's costs increased nearly to the level of the F-14, largely due to the addition of various capabilities, such as a long-range missile and associated equipment.

Also in 1971, the extravagance of the Trident program became an issue. The Trident submarine and missile is, next to the MX, the most expensive weapon system ever conceived. As Carter and Steinbrunner persuasively argue, the program contains "a serious imbalance between the technical characteristics of the weapon system and the comprehensive military requirements. In size, speed, and cost, the Trident exceeds objectively defendable standards."[47] These characteristics were largely the result of internal Navy politics, with Admiral Rickover prevailing with a design for a large boat that would allow advance nuclear reactor technology developed under his auspices to be employed.[48]

The cost of the Trident, and even larger variants proposed earlier in the development process, "inspired outrage" in Packard,[49] who demanded a halt to the Navy's profligacy. Though the Navy eliminated the more extravagant variants, Packard decided to defer new submarine construction until "the early 1980s," and to put the Trident I missile on existing Poseidon boats,[50] an option, long in development under the name EXPO, that had been opposed by the Navy.

Packard may have prevailed in his decision, but, despite congressional reluctance to fund the program, the Navy demanded that the accelerated rate of development of the Trident submarine adopted as a "bargaining chip" during SALT negotiations be sustained in exchange for its support of the SALT Treaty. Moreover, the President sought to use the Trident as a future bargaining chip with the Soviets and a means of placating domestic critics of the treaty. In the end, the Navy's version of the boat was approved.[51] The existence of a realistic option and the support of some anti-Rickover factions within the Navy had failed to create the conditions for a successful move toward lower-mix weapons.

Apart from countless adjustments to appropriation line items, program schedules, and the like--which, incidentally, any DoD administration can be expected to affect--the influence of Laird and Packard appears to have been in the pressure they exerted toward the procurement of lower cost weapon systems. Their legacies are the F-16 and the A-10, both subject to a prototype stage insisted upon by Packard, and the retrofitting of Poseidon submarines with Trident I missiles. The constraints on their influence, as was the case with McNamara, is revealed in numerous failures to alter service priorities and in the price paid for these limited gains: continued support for most of the expensive, high-mix weapons favored by the services.

IX

The management approaches of McNamara and Laird were notably different. McNamara sought to use control over the force structure and associated budget allocations together with careful analysis of military requirements to influence military capabilities. In contrast, Laird preferred to exert his influence through establishing budget ceilings, issuing general policy guidance, and intervening selectively in shaping weapons proposals, leaving the analysis of military requirements to the services and detailed budgetary allocations to the comptrollers in the services, OSD, and OMB. What is striking in both cases is that the general contours of their management approaches mattered far less to the results each achieved than their personal efforts to influence specific decisions. In the end, both accomplished similar results. Both succeeded in exercising limited influence over weapons design, procurement and performance through becoming involved, either themselves or through their deputies and assistants, in individual weapons projects. Moreover, both became involved in these projects for similar reasons: the unacceptably high unit costs and inappropriate designs incorporated in weapons proposals emerging from the services. Through their interventions in specific projects, both were able to exert limited influence over force planning priorities, though McNamara was somewhat more successful in this regard. It is virtually impossible to identify any significant differences in budgetary allocations, budget totals, or force levels and capabilities traceable to their particular uses of PPBS, beyond the few mentioned. The lesson here seems clear: a management system such as PPBS, ZBB or MBO can create or enlarge opportunities to manage, but the Secretary must then take the time to manage. The system is not the solution.

The explanation for this finding is to be found in the character of the budget and weapons acquisition processes. These processes are characterized by their decentralization, an extraordinary amount of technical and programmatic detail, and the dominance and relative inflexibility of service and staff bureaucracies. It takes enormous amounts of time and effort to influence that process, and there are practical limits to what any official can accomplish.

Perhaps the key to weapons acquisition problems lies in the very early stages of conceptualization. Lurking behind every major weapon proposal are assumptions about the kind of combat capability that is required. These assumptions are typically made early in the development process, at levels well below the scrutiny of top departmental officials. They reflect the missions service leaders regard as most important. They may or may not reflect correct judgments concerning the kinds of capability that will best serve our interests, viewed from a national and inter-service perspective. By the time congressional and executive branch officials become aware of such assumptions, they have been hardened into concrete weapons system proposals that have achieved considerable momentum. The underlying assumptions are primary determinants of future weapons system costs and performance. If it is assumed, for example, that the basic Air Force fighter/bomber must be designed to fly from bases in rear areas to attack targets deep in Poland at night and in bad weather, and if it is further assumed that they must be able to identify and destroy high-speed Soviet fighters beyond visual range, then highly complex, extremely expensive F-15s and F-16s will be "required" and that is the kind of weapons system that the Secretary of Defense and the Congress will be asked to approve. Civilian officials may pale at the cost and be skeptical of the need, but the opportunity to prevent momentum from developing behind a questionable idea has long since passed. Instead of a well-informed debate over the kind of capability that is needed, and what we are willing tc pay for it, there will be a head-on clash between skeptical but inexpert civilians and the nation's senior military leaders backed by their contractors. It is an unequal struggle.

No group of top officials can hope to change these processes fundamentally. There is no management system that will solve the problem of controlling defense resource allocation. Their best hope for exerting influence over military capabilities is to make a selective and determined attempt to accomplish a few major goals where the economic, political, and military stakes are overriding. For the rest, their best bet is to look for alies wherever they can find them--among factions within the services, in OMB and the White House, in congressional subcommittees, and among influential outside groups and individuals--and to build a constituency for the changes they regard as important.

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Chairman **Roth**. Our final witness is Russell Murray, who is former Under Secretary for Program Analysis and Evaluation, Department of Defense.

Mr. Murray, we, as usual, are running late. We apologize for keeping you waiting, but look forward to hearing your testimony.

TESTIMONY OF RUSSELL MURRAY, FORMER ASSISTANT SECRETARY FOR PROGRAM ANALYSIS AND EVALUATION, DEPARTMENT OF DEFENSE

Mr. **Murray**. I think I should start, Mr. Chairman, by confessing that I never made under secretary. Assistant Secretary was the best I could do.

I have furnished your staff with a written statement addressing a number of the issues that you mentioned in your letter of invitation to me.

I would like only to touch on the highlights to leave time for questions.

Excessive reliance on high technology: The first and perhaps most important issue I would like to touch on is one about which a great deal has been written and said recently and it is whether we have come to rely too heavily on high technology. Though I support the voices calling for change, I caution against swinging the pendulum too far in reaction.

We face an increasingly sophisticated enemy and we cannot simply retreat to the cross bow.

It is foolish to reject all new technology as a matter of principle, when all we need to reject is just the technology that doesn't work. The problem is that we don't know which new technology works and which doesn't because too much of our testing is done during the technical development of our new hardware—developmental testing—and too little under conditions simulating operations in combat, which we call operational testing.

We are, in my opinion, grossly neglecting our operational test and evaluation, or O.T. & E. We also neglected it before World War II, and I would like to cite an instance of the price we paid then.

Our submarines, returning to Pearl Harbor from the early war patrols, brought with them tales of torpedoes that had hit Japanese ships and failed to explode. The shore establishment that had developed the torpedoes before the war refused to believe that their design could be at fault, and the boats were repeatedly sent back to sea to try again.

Results were no better, and the evidence that something was seriously amiss culminated more than a year after Pearl Harbor when the skipper of the U.S. submarine *Tinosa* successively fired eight torpedoes at a damaged and dead-in-the-water Japanese merchant ship, the *Tonan Maru*. All eight hit, dead on the beam. Not one exploded.

With the shore establishment still clinging to their assertions that the problem was nothing more than bad tactics and poor maintenance in the fleet, the operational commands themselves finally conducted the long-delayed operational tests. They uncovered the fault in the firing pin, which had worked fine in the kind of prewar tests that the engineers had run, but it took them until September, 1943—20 months after the start of the war.

In the interim, we had missed a fleet of Japanese ships, and lost an unknowable number of submarines and crews who were unlucky enough to have alerted Japanese destroyers to their presence by pounding on their hulls with dud torpedoes.

Interestingly enough, the Germans—also having neglected independent operational testing—had almost exactly parallel problems with their torpedoes, had the same arguments between the operating and engineering communities, and had the same 2-year delay in getting to a reliable design.

But with the Japanese, things were different. They alone had subjected their torpedoes to proper operational testing before the war—live shots at sea against real hulls—and you remember what happened at Pearl Harbor.

Could that kind of thing happen again? Yes, indeed; in my opinion, it would be inevitable. Why has nobody raised the issue before? They have. Among the findings in 1970 by the highly respected blue ribbon panel commissioned by Secretary Laird was the judgment that we were still grossly deficient in operational testing.

They recommended that the DOD "establish an operational testing and evaluation group, with civilian leadership, within the Office of the Secretary of Defense, reporting directly to the Deputy Secretary of Defense."

Such an office was created under the leadership of a distinguished retired general officer with a "dotted line" reporting relationship to the Deputy Secretary.

The organization was associated with the Director of Defense Research and Engineering, but supposedly only for housekeeping and administrative purposes.

However, with the passage of time, the head of the organization changed, the dotted line to the Deputy Secretary atrophied, the housekeeping relationship grew into complete control by D.D.R. & E., and operational testing was once again subordinated to, and effectively lost within, developmental testing.

I believe that the blue ribbon panel was exactly right. Leaving operational test and evaluation in the hands of the Under Secretary for Research and Development faces him with an unavoidable conflict of interest. In effect, it puts him in the position of grading his own final exams.

I believe, therefore, that either an independent office should be set up to handle O.T. & E., as recommended by the blue ribbon panel, or the responsibility should be transferred to an existing office with the necessary expertise but free from any conflict of interest.

The organization must be staffed to handle the great variety and number of new weapon systems. It must also be funded to support the necessary development of operational test ranges and the conduct of joint operational tests.

The final, key requirement is that the senior leadership in the Department be determined to put real teeth into O.T. & E., and be prepared to defend it against a most certain opposition. One of the unpleasant tasks facing such an organization, if it is to do its job well, is rejecting some new weapon systems as not ready for production. That would naturally reflect on and be opposed by elements of the research and engineering community, both military and civilian, as well as the industrial firms whose production programs could be delayed. Those most likely to endorse such hard-nosed rejections—the men in the field who would have to use the new hardware—unfortunately tend to have a small voice in such Pentagon battles. Thus, the strength of the O.T. & E. organization is unlikely to be any greater than the strength of the Secretary's support for it.

Though there have been cases of our O.T. & E. serving its purpose, unfortunately they are the exception. A more typical example is the Maverick. If we had only run a conceptual operational test before we invested so heavily in the Maverick, we could have discovered that instead of decreasing the vulnerability of an aircraft attacking a tank, it actually tends to increase it.

We could have discovered the F-15's inadequate fuel capacity and the stall-stagnation problems with its F-100 engine, and avoided expensive "get-well" programs. The Patriot missile will, I fear, continue to suffer from low readiness, poor performance, extensive retrofit programs, and cost overruns because of having been approved for production without adequate operational testing.

We may think we are doing the right thing by rushing the latest equipment to the field, but we are doing the exact opposite. We lose all discipline in the acquisition process and kid ourselves that we will be able to bring programs up to snuff through retrofits and band-aids.

People rightly worry about the acquisition process already taking too long, but wrongly try to speed things up by shortcutting the operational tests. That may get hardware into the field sooner, but not working hardware. The way to do that is to get the design right before—not after—it is built.

Obviously, the more complex and sophisticated a weapon is, the harder it is to get it right. With our understandable trend toward higher technology and greater complexity, we may have tended to become frustrated with the time that proper development takes, and to recoil from adding to it by running tough operational tests and paying attention to the results. That, in turn, has inflicted half-developed systems on our forces in the field, and given high technology a reputation it may not deserve.

The answer is not to reject high technology, but only to demand that it works before we accept it. And that is the whole reason for operational testing—a most sadly neglected activity in the Defense Department.

Inaccurate cost estimation: I would like to divide the next subject—inaccurate cost estimation—into two parts: Cost estimation itself, and provisions for inflation.

As for the latter, the FYDP [five-year defense program], has been, and I believe still is, based on optimistically low inflation estimates. The more those estimates are off, the less useful that document becomes. That is a serious problem, since the FYDP is nothing less than our plan for attaining at least the physical means of achieving our announced national security objectives. To the degree that it is optimistic, we mislead ourselves about the realism of those objectives.

Though some of the blame for understating inflation may lie within the Defense Department, in my experience the heart of the problem is political. All administrations, in time of inflation, promise to do something about it. Having said that, they can hardly publish figures in the FYDP that concede the failure of their programs in advance. Thus, the Defense Department is constrained to use estimates that are politically, if not economically, logical.

My suggestion is that there should be an alternative version of the FYDP based not on OMB-imposed inflation estimates, but on independent estimates from the reputable private firms whose predictions have been so much better than those we have been forced to use in the FYDP.

In my view, if such a version of the FYDP were demanded, it would soon become the only one to which anybody paid any attention, and we would have gotten rid of at least a part of a troubling problem.

As for cost estimation itself, I believe that the state of the art is rather more advanced than the record might indicate. As you are well aware, most of the incentives seem to be for the services and their contractors to understate future costs. I have two suggestions in this regard.

The first is that the official future costs of weapons be based no longer on unchallenged Service estimates, but rather on estimates of—or approved by—the Department's cost analysis improvement group, known as the CAIG.

The CAIG does include representatives from all the Services, but it is chaired by an OSD official at the deputy assistant secretary level. Over the past decade, it has established a record of cost estimates far more accurate than those of the services—partly because of talent, and partly because of a freedom from institutional constraints. While I would not envision the CAIG even attempting to examine all the cost estimates of all the services, it should, in my opinion, examine and correct as necessary those having significant effect.

My second suggestion in this regard is closely related. One of the reasons it is hard to maintain good cost estimates is that systems seem to change almost continuously, and usually in ways that make them more expensive. Therefore, to establish more rigor and discipline, I suggest that the services should have to report all changes that might affect costs in any significant way to OSD—not only so that the CAIG could adjust the official estimates as necessary, but also to make the upward creep of costs a matter for explicit approval by the Secretary of Defense rather than a matter of eventual astonishment.

The next issue mentioned in the chairman's letter is competition. Though I believe that the government should always try to have at least one credible alternative to any manufacturer, and that few factors are as potent as competition in keeping performance up and costs down, I am far from an expert witness in this field.

The only suggestion I have to offer is that the committee might want to look into competition not just among the major contractors, but at the second and third tier levels, and whether some form of subsidy to enhance competition there might be preferable to continuing to pay not only single source, but single possible source, prices. My full statement expands somewhat on this point.

As a final subject, the chairman's letter to me indicated an interest in my reaction to Deputy Secretary Carlucci's memorandum of last April 30 on "Improving the Acquisition Process." I think the Secretary's efforts are commendable. Though I am skeptical as to some of his initiatives, I specifically oppose fewer than one in six—and those due mainly to matters not of fact, but of philosophy regarding decentralization and delegation. I would like to refer the committee to my full written statement for point-by-point comments, and touch now on only a few key issues.

One of these in which I believe you have considerable interest is the Secretary's call for funding stability and his proposal to force the services to program procurement at efficient rates. These are beyond challenge as worthy objectives but, in my opinion, unlikely to have much long-term effect. Stretching out production is expensive, but we do it and, I venture to say, will continue to do it to one degree or another for at least three reasons:

First, senior managers in the DOD are sometimes reluctant to plan on buying out a program in a few years of efficient, high-rate production. They fear that when the scheduled end of the program rolls around, they may not be able to turn it off, remembering past programs that have been forced back into the budget by Congressmen whose constituents would otherwise have suffered.

Second, when budgets begin to pinch—as all seem to sooner or later—the overwhelming tendency has been to cut back a little on all programs, slowing them down and stretching them out. While it might be more "efficient" to wipe out one of them and leave the rest alone, that choice is always unpalatable and often impractical because of the constituencies that grow with a program.

Thus we accept the inefficiencies, a little bit at a time, year by year—not because we are stupid, but because the inefficiencies are often the lesser evil. Saying that we are now going to break that habit is the easy part; doing it is a lot tougher and not necessarily wiser.

And, third, there is something to be said for keeping a production line open, even at theoretically inefficient rates, to help maintain an industrial capacity, to hedge against delays or failures in new systems, and to provide a surge production capacity for emergencies.

Among the initiatives with which I take issue is a decision to cut the number of DSARC reviews of new weapon systems from four to two. In my view, giving the Secretary of Defense only one opportunity to review a program after its initiation and to expect him, in effect, to approve full-scale production well before development—much less operational testing—is completed, is not only a move in exactly the wrong direction, but both unrealistic and unlikely to prevail.

A related decision to submit the mission element needs statements as part of the Service POM's strikes me as unwise, in that it entangles the authorization-like DSARC process with the appropriation-like PPBS process. I also disagree with adding the service Secretaries or Chiefs of Staff as members of the DSARC. They have always been welcome to attend DSARC meetings and present their views, but to have them become voting members puts them in the position of judging their own proposals.

My final disagreement is with the decision to leave the Undersecretary of Defense for Research and Engineering as the Defense Acquisition Executive. As the committee will recall, matters of production, as opposed to research and developnent, were formerly the province of the Assistant Secretary of Defense for Installations and Logistics, a position since abolished.

I believe the former organization was preferable. The U.S.D.R. & E. should be an advocate for new systems and new technology, and that should be his primary field of expertise: But those interests and qualifications are likely to bring with them a particular view regarding the desirability of producing the new weapons that he has just developed.

While that view needs to be heard, vesting it with the authority of the acquisition executive tends to undercut the influence that other considerations should have on production decisions.

I would like to conclude with a short recap of the suggestions I have made to you today:

One, transfer the responsibility for O.T. & E. from the U.S.D.R. & E. to an office free from conflict of interest, adequately staffed, and funded.

Two, develop an alternative FYDP using independent, nongovernmental inflation estimates.

Three, rely on the CAIG for official cost estimates.

Four, require the services to submit all proposed weapon changes for cost updating by the CAIG and approval by the Secretary of Defense, and;

Five, investigate competition among second and third tier suppliers.

I thank you very much for the opportunity to share these thoughts, and hope you have found some of them useful.

Senator COHEN. Of all the recommendations you made, I didn't hear anything with respect to Congress. What is our role?

Mr. MURRAY. I can recall, Senator Cohen, when I first worked in the Defense Department in the 1960's, feeling that the Congress was in a very poor position and was totally inadequately staffed.

On my return in the seventies, I noticed things had changed considerably. My frank opinion is there is a good deal too much detailed program management of the Department of Defense on the part of the Congress. That is a particular problem, not only because of the effort and paperwork it involves, but also because it mixes the executive and legislative functions. Those who try to control the Defense Department in extreme detail from this side of the river bear no responsibility for the execution of their recommendations, which in some cases are written into the law.

I would think the important thing for the Congress is not detailed program management, but more attention to some of the things Dr. Lynn was mentioning (the basic concepts behind various weapons systems) and, even more importantly, what U.S. national security policy should be, and what our objectives should be.

Those are incredibly difficult subjects and much more taxing to address than the question of whether we should build one sort of airplane or another. Nonetheless, it seems to me it is a function the Congress should be more actively engaged in.

Senator COHEN. Let me follow up a little bit on that.

Part of the difficulty and frustration is many of us in Congress find ourselves in the position of watching all of this take place, watching various managers go through the OSD, and then being presented with a bill. The bill is $226 billion and climbing, and the public is saying we can't pay that amount of money.

The President is coming back and saying, "Well, maybe we can't spend as much as we need to spend on defense."

I stated last year that if it comes to a balanced budget or better defense capability, the balanced budget will have to wait. Suddenly that is changed.

The reason we have placed emphasis on high technology is that we have decided as a nation we cannot compete on a man-for-man, plane-for-plane, basis with the Soviet Union. We simply cannot do it. So, we compensate and compensate through high technology. We have so relied upon high technology that it is getting so expensive. Subsequently we are getting fewer and fewer weapons systems. Our defense is not getting more capable, but less capable and costing us more money. The reform group should not be construed as saying we reject high technology and go back to the bow and arrow. You would be classified as a reformer. You want to change something we are doing wrong. You want to spend more money on the operational testing process. That is a reform, in my judgment.

I don't think it can be said you are against technology, nor are we.

I was thinking of the quotes which came out today. We heard from Mencken and Shakespeare. There is one of Yeats, as well. He said he had neither youth nor age, but, as it were, we're dreaming on both. I think if we make the mistakes you are suggesting, we reject high technology and look at quantity, we will not get more quantity and will not get more capability; we will have less of both.

I don't see that as a goal of the reformers but rather how do we deal with the problem of paying more and more and getting less and less capability? That is what I see as the mission of the so-called reform group which is a very, very loose coalition of essentially prodefense-minded Senators and Congressmen.

Mr. MURRAY. Senator, let me make my position clear on that. On balance, I lean much more toward the reformers' position than I do toward the high technologists' position. As I said in the statement, I agree that we should make changes and that we have discounted the desirability of larger, if less sophisticated, forces. We have also developed systems that we cannot maintain with the type of people that we can hope to keep in the armed services. And I certainly would not want to put myself up as an advocate of high technology. I am sure there is nobody in D.D.R. & E. that would class me as a friend of the high technologists. My concern, though, is that the reaction not be extreme, and that we do not go back to buying systems that simply will not stand up to the Soviets' increasingly sophisticated equipment.

Senator COHEN. Again, coming back to the congressional role, you indicate that we should certainly rely more on an outside independent group that might more accurately evaluate the cost of a project. Essentially, you are suggesting that DOD use CAIG much more effectively than we currently do.

What about requiring some sort of report to Congress itself? You want to make sure the OSD has a very active involvement in the whole process, but if there is to be, for example, a major change, something in excess of 10 percent on any particular weapons system, would it be a positive or a negative factor in your mind to say that should go to the Armed Services Committee of both Houses? Or is that the kind of micromanagement you think is too burdensome?

Mr. MURRAY. It seems to me the Secretary of Defense should be concerned about much smaller changes in cost than should be brought to the attention of the Congress. There should be a threshold at which the Congress is informed that the budget they have authorized and appropriated now has become impossible for one reason or another. That should be brought to their attention.

I am not sure I would be willing to make a recommendation for exactly what the criterion should be for when the Congress would be notified. I think one of the important things, however, is that the Secretary of Defense be notified so he can exercise control over the Department. When costs are escalating, it would perhaps give him a chance to do something about it.

Senator COHEN. I have one more question.

One factor that has not been touched upon but perhaps will in the course of these hearings is a growing list of foreign sole-source suppliers. This fact, I think, along with our foreign sources for energy and many raw materials, is making us extremely vulnerable to supply disruptions in the future.

I have in mind a particular instance in which one of the Services to awarding a sole-source contract to a company in France that would develop and adapt a three-dimensional weaving process to be used on rocket nozzles and exit cones for strategic systems. Despite the fact this technology was developed in this country, we are nonetheless going to France for the purchase of that kind of technology which will in effect reduce our own domestic base for it.

Maybe this comes back to policy decisions being made by the Congress, but it seems to me we ought to have a general policy of trying to encourage the production of critical materials or critical systems in this country. To what extent that contravenes or contradicts the seventies in which you were involved in the Defense Department; namely, integration in NATO, France is not part of the NATO system. Nonetheless, we did talk about having interchangeability or interoperability. It seems to me if we start contracting out to foreign sources for critical weapon systems, we reduce our own industrial base, and invite a much different threat in the future.

That has not been addressed to date. I am not sure it will be.

Jack Gansler, I know, has written on this subject. At least in the long-term planning, we ought to try and encourage as much of domestic production of those kinds of systems as possible. I wonder if you agree with that.

Mr. MURRAY. I do. You have to make a judgment in each case about the reliability of the supplier.

Some are going to be less of a concern than others might. I think it would be unwise to establish a rule that would say, for example, we cannot contract anything overseas. So once again, like most problems in defense, it is a very difficult matter of judgment.

I do share your concern; if you don't have a reliable source of supply for a vital weapon system, you could be in a lot of trouble.

Senator COHEN. We are going to come under increasing amount of criticism on the Roland system. We are talking about canceling our participation.

I started receiving letters from friends of mine in Western Europe saying, "What are you doing? Why are you now backing out of this system which has, again, foreign policy implications, as well as strategic defense considerations?"

Mr. MURRAY. Yes, that is an example, incidentally, of the difficulty of maintaining the stability in weapons programs that Secretary Carlucci's initiatives call for. The new administration, I think, is beginning to run up against those problems now. They are being forced to fit things into a specific budget.

Senator COHEN. Thank you very much, Mr. Murray.

Mr. Chairman, I have no more questions.

Chairman ROTH. Thank you, Senator Cohen.

I just have one or two questions. This morning there was a great deal of discussion about the industrial-military complex. How do you evaluate that problem?

Mr. MURRAY. The Defense Department as a whole and weapons systems in particular have an immense amount of inertia. It is often difficult to trace back to where a program started. Once a program starts, it builds constituencies of all kinds and it is almost impossible to say who is responsible for the startup of the program, or who is responsible for any particular move or trend from a simple system to a complex system.

It is immensely difficult to track that kind of thing, and, therefore, it is immensely difficult to control it. I think you are quite correct; it is a system of great complexity and things happen over a long period of time. None of these weapon system projects is easy to document. I can recall a fine piece of work that was done back in the 1960's on the development of the A-7 in whch I played a peripheral role. In reading through that, I was impressed by the complexity of even that decision on the Navy and Air Force versions of the A-7. It was written by then Major Head of the Air Force Academy, now a colonel at the Pentagon.

Chairman ROTH. Is it extremely difficult to get a program stopped even though it is learned it is becoming expensive or not operating as well as possible?

Mr. MURRAY. It is difficult, but there have been cases in which projects have been stopped. Senator Cohen mentioned Roland. The Skybolt and the Cheyenne helicopter were dropped. Two air-to-air missile programs were terminated. So stopping programs is possible, if oftentimes difficult. It has been difficult to stop the C-130, the A-7, and it was difficult to stop the F-111. It is not always easy to turn them off.

Chairman ROTH. Senator Cohen asked you a number of questions on the role of Congress. On the positive side, to what extent do you think politics and congressional intervention has dictated the decision that is not necessarily based on what is best from the defense standpoint?

Mr. MURRAY. I believe it has happened. The case I just mentioned—the decision to keep the A-7 line running—is an example of a congressional imposition that is not in the best interests of national security.

A larger one, and one of the greatest potential sources of cost savings, is the closing of unnecessary bases. You know what a difficult political problem that is. I suspect there are billions of dollars per year from closing excess bases. It is always politically very hard to get that to happen.

Chairman ROTH. It takes several years before you would realize any savings.

Mr. MURRAY. That is one of the things that make it even more difficult. The initial costs of shutting down a base are positive. It costs you money to shut them down, though of course you save in the long run.

Chairman ROTH. There has always been a number of questions in the area, a sweetheart arrangement, people go in and out of the Defense Department to industry, or to law firms.

What is the answer, do you think our conflict of interest statutes are adequate or do they need to be revised or reviewed?

Mr. MURRAY. I don't believe there are serious problems of conflict of interest, endemic problems.

I am not impressed that that is responsible for serious problems in the defense program. I think a far more serious problem is the difficulty that the Government now has in attracting senior and qualified people to serve at the higher levels. It is not simply a matter of totally inadequate salaries. It is also a matter of disclosing their financial sources of income and holdings, as well as those of their families, and making all that a matter of public record.

It is a matter of a loss of perquisites at the higher levels. It is a matter of having to sell all one's securities and pay any capital gains taxes on the spot.

It is a matter of having to pay your own expenses in moving from California to the Pentagon. It is a matter of not being completely free in the kind of employment that you can accept after leaving the Government.

In effect, we have made Government service perhaps as unattractive as we can and what we will pay for that is incompetence in management.

Chairman ROTH. I gather what you are suggesting is we ought to look at the whole ball of wax that governs the recruitment of individuals from private life into Government.

Mr. MURRAY. I think that would be most well-advised. Perhaps the most foolish economy that can be inflicted is trying to pay substantially less than the going cost of competent top management.

The amount of the country's resources in the Treasury spent every year by the Department of Defense is immense, absolutely immense. The thing the Congress should be interested in is making sure they get the most qualified people to manage that process.

Chairman ROTH. You mentioned, for example, the requirement that you sell stocks and so forth, do you think disclosure would be a preferable solution, in other words, rather than require an individual who accepts the position, say, in the Department of Defense, not to sell it but to disclose it? I think we all agree that if you have a stock in a particular company, you should have nothing to do with awarding contracts in involving that company.

Mr. MURRAY. Let me put it in personal terms. When I worked in the Defense Department, I did not want to have any stocks in any firms that had anything to do with the Defense Department in a significant way. I would have sold them even in the absence of regulations.

The part that seems to me unjust is the requirement that any capital gains taxes that accrue from that sale then must be paid by the nominee on the spot.

I would think it would be perfectly easy to establish a new tax base for whatever the individual wants to reinvest those funds in, somewhat akin to the provisions that are made when you sell one house and buy another within a year or a year and a half. You don't pay any capital gains on the first house at that point. You merely establish a new tax base for the second house.

What that would mean is the Government would not reap a windfall from having persuaded somebody to come and work for it. I don't see why that could not be done. Even though it would correct only one of the many disincentives for Government services, it seems to me it should be done.

Chairman ROTH. That is an interesting suggestion.

Thank you for being with us today.

[Mr. Murray's prepared statement and responses to written questions submitted by Senator Roth follow:]

STATEMENT OF RUSSELL MURRAY 2nd
Before The
SENATE COMMITTE ON GOVERNMENTAL AFFAIRS
October 21, 1981

Mr. Chairman, Members of this distinguished committee; your invitation to appear before you today does me a great honor, particularly in view of the importance of the issue you are addressing: the management of the acquisition process in the Department of Defense. I greatly appreciate the opportunity to contribute my thoughts to your deliberations, and hope that you will find at least some of my suggestions useful.

The Chairman's letter of invitation to me outlined four areas of particular interest to you:

- Excessive reliance on high technology in weapon system design,
- Inaccurate cost estimation for new weapon systems,
- The lack of competition in weapons procurement, and
- Secretary Carlucci's memo of last April 30th: "Improving the Acquisition Process", which includes the subject of funding instability.

I would like to address each of those issues in turn.

EXCESSIVE RELIANCE ON HIGH TECHNOLOGY

The first, and perhaps most important issue, is one about which a great deal has been written and said recently: whether we have come to rely too heavily on high technology. In my view, the trend in past years has been increasingly worrisome. I think we've tried too hard for the ultimate in performance and too little for even the acceptable — much less the ultimate — in reliability. But though I support the voices calling for change, I caution against swinging the pendulum too far in reaction. We face an increasingly sophisticated enemy, and we cannot simply retreat to the crossbow. It's foolish to reject all new technology as a matter of principle, when all we need to reject is just the new technology that doesn't work.

The problem is that we don't know which new technology works and which doesn't because too much of our testing is done during the technical development of our new hardware — developmental testing — and too little under conditions simulating operations in combat — operational testing.

The object of developmental testing is to find out whether a new weapon meets its technical specifications. The object of operational testing is to find out if the weapon — even if it does meet its specs — will really be useful in combat.

Developmental testing is conducted by highly trained scientists, technicians, and specialists under tightly controlled, laboratory-like conditions. Operational testing is conducted out in the field by run-of-the-mill servicemen under conditions simulating wartime as closely as possible.

We are grossly neglecting our Operational Test and Evaluation, or OT&E. We also neglected it before World War II, and I'd like to cite one instance of the price we paid then.

Our submarines returning to Pearl Harbor from the early war patrols brought with them tales of torpedoes that had hit Japanese ships and failed to explode. The shore establishment that had developed the torpedoes before the war refused to believe that their design could be at fault, and the boats were repeatedly sent back to sea to try again.

Results were no better, and the evidence that something was seriously amiss culminated more than a year after Pearl Harbor when the skipper of the "Tinosa" successively fired eight torpedoes at a damaged and dead-in-the-water Japanese merchant ship — the "Tonan Maru". All eight hit, dead on the beam. Not one exploded.

With the shore establishment still clinging to their assertions that the problem was nothing more than bad tactics and poor maintenance in the fleet, the operational commands themselves finally conducted the long-delayed operational tests. They uncovered the fault in the firing pin (which had worked fine in the kind of pre-war tests that the engineers had run), but it took them until September, 1943 — 20 months after the start of the war. In the interim, we had missed a fleet of Japanese ships, and lost an unknowable number of submarines and crews who were unlucky enough to have alerted Japanese destroyers to their presence by pounding on their hulls with dud torpedoes.

Interestingly enough, the Germans — also having neglected independent operational testing — had almost exactly parallel problems with their torpedoes, had the same arguments between the operating and engineering communities, and had the same two-year delay in getting to a reliable design. But with the Japanese, things were different. They alone had subjected their torpedoes to proper operational testing before the war (live shots at sea against real hulls), and you remember what happened at Pearl Harbor.

Could that kind of thing happen again? Yes, indeed; in my opinion, it would be inevitable. Why has nobody raised the issue before? They have. Among the findings in 1970 by the highly respected Blue Ribbon Panel commissioned by Secretary Laird was the judgement that we were still grossly deficient in operational testing. They recommended that the DoD "Establish an Operational Testing and Evaluation Group, with civilian leadership, within the Office of the Secretary of Defense, reporting directly to the Deputy Secretary of Defense."

Such an office was created under the leadership of a distinguished retired general officer with a "dotted line" reporting relationship to the Deputy Secretary. The organization was associated with the Director of Defense Research and Engineering, but supposedly only for housekeeping and administrative purposes.

However, with the passage of time, the head of the organization changed, the "dotted line" to the Deputy Secretary atrophied, the housekeeping

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relationship grew into complete control by DDR&E, and operational testing was once again subordinated to and effectively lost within developmental testing.

I believe that the Blue Ribbon Panel was exactly right. Leaving Operational Test and Evaluation in the hands of the Undersecretary for Research and Development faces him with an unavoidable conflict of interest. In effect, it puts him in the position of grading his own final exams.

I believe therefore that either an independent office should be set up to handle OT&E, as recommended by the Blue Ribbon Panel, or the responsibility should be transferred to an existing office with the necessary expertise but free from any conflict of interest. The organization must be staffed to handle the great variety and number of new weapon systems. It must also be funded to support the necessary development of operational test ranges and the conduct of joint operational tests.

The final, key requirement is that the senior leadership in the Department be determined to put real teeth into OT&E, and be prepared to defend it against a most certain opposition. One of the unpleasant tasks facing such an organization, if it is to do its job well, is rejecting some new weapon systems as not ready for production. That would naturally reflect on and be opposed by elements of the research and engineering community, both military and civilian, as well as the industrial firms whose production programs could be delayed. Those most likely to endorse such hard-nosed rejections — the men in the field who would have to use the new hardware — unfortunately tend to have a small voice in such Pentagon battles. Thus, the strength of the OT&E organization is unlikely to be any greater than the strength of the Secretary's support for it.

Though our OT&E leaves much to be desired, there have been occasional examples of its serving its purpose. One is the Phalanx, designed as a last-ditch defense of our ships against anti-ship missiles. Having done poorly in its operational testing, Phalanx was "sent back to the drawing boards". When it returned for a second try, it had been transformed into the effective system that it had been supposed to be from the start. Another example was the EF-111A jamming aircraft, whose production was held off until the maintainability problems uncovered in OT&E were corrected. And the AIMVAL operational test program showed that the concept behind the proposed Claw and Agile air-to-air missiles was invalid, saving the country a great deal of money and avoiding a futile development program.

But unfortunately, those cases are the exception. For example, if we had only run a conceptual operational test before we invested so heavily in the Maverick, we could have discovered the weaknesses in that concept. The idea behind the electro-optical Maverick was to let an aircraft fire a missile at a tank from a safe "stand-off" distance. However, it proved so difficult to recognize a tank — not on a test range, but in the field -- through the Maverick's seeker, that no great stand-off was possible. In addition, evasive maneuvers were impossible during the relatively lengthy lock-on process. Similar sorts of limitations afflict the newer infrared imaging version of Maverick. Thus, under realistic conditions, what had started out to be a vulnerability-reducing weapon turned out to have the opposite effect. A modest OT&E program could have shown that that would be the case without having had to go through the whole development.

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There are many other such examples. The stall/stagnation problems with the F-100 engine in the F-15 did not really come to light until the aircraft was flown in conditions simulating combat. Nor did its inadequate fuel capacity that brought with it the expensive PEP-2000 "get well" program and, more recently, the conformal tank configuration.

The Patriot missile is an example of an extremely expensive system that has been approved for production before having passed its operational testing under anything like realistic field conditions. Indeed, my understanding is that none of the Patriot tests had been run without contractor personnel before it was approved for production. I have no doubt that this system will continue to suffer from low readiness, poor performance, expensive retrofit programs, and cost overruns.

We may think we are doing the right thing by rushing the latest equipment to the field, but we are doing the exact opposite. We lose all discipline in the acquisition process and kid ourselves that we'll be able to bring programs up to snuff through retrofits and band-aids. People rightly worry about the acquisition process already taking too long, but wrongly try to speed things up by shortcutting the operational tests. That may get hardware into the field sooner, but not working hardware. The way to do that is to get the design right before — not after — it's built.

Obviously, the more complex and sophisticated a weapon is, the harder it is to get it right. With our understandable trend toward higher technology and greater complexity, we may have tended to become frustrated with the time that proper development takes, and to recoil from adding to it by running tough operational tests and paying attention to the results. That, in turn, has inflicted half-developed systems on our forces in the field, and given high technology a reputation it may not deserve.

The answer is not to reject high technology, but only to demand that it works before we accept it. And that is the whole reason for operational testing — a most sadly neglected activity in the Defense Department.

INACCURATE COST ESTIMATION

I would like to divide the subject of inaccurate cost estimation into two parts: cost estimation itself, and provisions for inflation. As for the latter, the Five-Year Defense Program — or FYDP — has been (and I believe still is) based on optimistically low inflation estimates. The more those estimates are off, the less useful that document becomes. That is a serious problem, since the FYDP is nothing less than our plan for attaining at least the physical means of achieving our announced national security objectives. To the degree that it is optimistic, we mislead ourselves about the realism of those objectives.

Though some of the blame for understating inflation may lie within the Defense Department, in my experience the heart of the problem is political. All administrations, in time of inflation, promise to do something about it. Having said that, they can hardly publish figures in the FYDP that concede the failure of their programs in advance. Thus, the Defense Department is constrained to use estimates that are politically, if not economically, logical.

A suggestion that has been made in the past is to publish a second version of the FYDP in constant-dollar, rather than current-dollar, terms. I think that would be a useful thing to do for many reasons, but not for solving the problems that stem from underestimating inflation.

My suggestion is that there should be an alternative version of the FYDP based not on OMB-imposed inflation estimates, but on independent estimates from the reputable private firms whose predictions have been so much better than those we have been forced to use in the FYDP. In my view, if such a version of the FYDP were demanded, it would soon become the only one to which anybody paid any attention, and we would have gotten rid of at least a part of a troubling problem.

As for cost estimation itself, I believe that the state of the art is rather more advanced than the record might indicate. As you are well aware, most of the incentives seem to be for understating future costs. Contractors tend to understate them to help their chances of winning competitions, and the Services tend to understate them to help their chances of having new systems approved by the Secretary of Defense and the Congress. Costs seem to be overstated only when a Service tries to do in a system it does not want.

I have two suggestions in this regard. The first is that in the Defense budget, in the FYDP, and in presentations to the Congress, the future costs of weapons be based no longer on unchallenged Service estimates, but rather on estimates of — or approved by — the Department's Cost Analysis Improvement Group, known as the CAIG.

The CAIG does include representatives from all the Services, but it's chaired by an OSD official at the Deputy Assistant Secretary level. Though cost estimation is at least as much an art as it is a science, the CAIG over the past decade has established a record of far more accurate estimation than the Services have — partly because of talent, and partly because of a freedom from institutional constraints. While I would not envision the CAIG even attempting to examine all the cost estimates of all the Services, it should, in my opinion, examine and correct as necessary those having the largest effects on the budget and program. This might require some enhancement of the CAIG's small current staff, but I have not the slightest doubt that it would be a cost-effective move.

My second sugestion in this regard is closely related. One of the reasons it's hard to maintain good cost estimates is that systems seem to change almost continually, and usually in ways that make them more expensive. The solution is not simply to prohibit change; some changes are good ideas. But there should be more rigor and discipline in making them. Therefore I suggest that the Services should have to report all changes that would affect costs in any significant way to OSD — not only so that the CAIG could adjust the official estimates as necessary, but also to make the upward creep of costs a matter for explicit approval by the Secretary of Defense rather than a matter of eventual astonishment.

In summary, I believe that we could improve our cost estimates, first, by relying on independent experts instead of the OMB for inflation estimates; second, by relying on the CAIG instead of the Services for cost estimates; and third, by getting hold of the changes that keep increasing the the real — if not the estimated -- costs of our weapons.

LACK OF COMPETITION

The next issue is competition. It is hard to satisfy those who demand evidence that competition cuts costs, much less an accurate account of the savings. History does not disclose its alternatives, and cannot tell us what difference it would have made IF some program had been run differently.

Though I cannot possibly appear before you as an expert witness on this subject, I sincerely believe — particularly from my experience in the aerospace industry — that few factors are as potent as competition in keeping performance up and costs down. The government should, as a matter of policy, always try to have at least one credible alternative to any manufacturer — credible in terms of quality and time to deliver.

I have one suggestion in this regard. In connection with some work my company is doing on the subject of terrorism, we ran across a small firm that turned out to be the sole manufacturer of a vital component of the F-100 engine used in the F-15 and F-16. The important point was not that this firm is just the sole source for this part, but that it is apparently the sole possible source in the country. Our immediate concern happened to be with the effect that the loss of this plant to terrorists might have on the production of both of the current Air Force fighter aircraft. But if this example is not just a fluke, it suggests an equally important concern regarding competition and costing.

Being the only possible source puts one, as Red Barber used to say, "in the catbird's seat". I don't know what this firm charges for that part, much less whether their price is reasonable. I mention it only as an illustration, and not to draw special attention to the firm. It is only one small manufacturer of one of thousands of parts for the F-100. How many others are there in similar "catbird's seats", not just in the F-100 program, but in all the other programs? How many cases are there where the government, through its prime contractors, has no credible alternative supplier? Presumably, these thousands of small subcontractors are less subject to detailed government auditing than the major prime contractors. What determines their pricing? To what degree is it inflated by a lack of competition, and what is the aggregate effect on the cost of our weapons? Presumably, there must be some point at which it would be better for the government simply to subsidize alternative sources to assure competition than to go on paying sole-source prices.

I suggest that the committee might want to look into the question of, first, how much competition exists — not among the obvious major prime contractors — but at the second and third tiers; second, what aggregate effect that might have on the costs of our weapons; and third, whether additional competition should be subsidized at those levels.

THE CARLUCCI MEMORANDUM

In the detailed attachment to his memorandum of April 30th, Deputy Secretary Carlucci outlined, by my tally, 38 "Management Principles", "Recommendations", and "Major Issues for Decision". Leaving aside the 9 on which I have no opinion, I would like to cover (as enumerated in an attachent to this statement) the 10 that I endorse, the 13 that strike me as commendable in intent but probably futile in practice, and the 6 that I oppose.

I heartily endorse the four initiatives to improve readiness, reliability, maintainability, and support. In my opinion, we have devoted our technological skills too much toward expanding the outer limits of performance and too little toward developing systems that, if not quite the ultimate in performance, would waste little of their time in the shop and would not require constant and intensive care by PhDs.

I also endorse the initiatives to move to multiyear procurement, to budget realistically for inflation, to forecast the business base at major defense plants, to improve the source selection process and tie design-to-cost awards to proven performance, and to provide more early funding for tests.

Turning next to the initiatives about which I am skeptical, the first is the call for funding stability and the proposal to force the Services to program procurement at efficient rates. These are beyond challenge as worthy objectives but, in my opinion, unlikely to have any long-term effect. Everybody knows that stretching out production at a low rate over many years is expensive, but we do it and, I venture to say, will continue to do it to one degree or another for at least three reasons:

> First, senior managers in the DoD are sometimes reluctant to plan on buying out a program in a few years of efficient, high-rate production. They fear that when the scheduled end of the program rolls around, they may not be able to turn it off, remembering past programs that have been forced back into the budget by Congressmen whose constituents would otherwise have suffered.
>
> Second, when budgets begin to pinch -- as all seem to sooner or later -- the overwhelming tendency has been to to cut back a little on all programs, slowing them down and stretching them out. While it might be more "efficient" to wipe out one of them and leave the rest alone, that choice is always unpalatable and often impractical because of the constituencies that grow with a program. Thus we accept the inefficiencies, a little bit at a time, year by year — not because we're stupid, but because the inefficiencies are often the lesser evil. Saying that we're now going to break that habit is the easy part; doing it is a lot tougher and not necessarily wiser.
>
> And third, there is something to be said for keeping a production line open, even at theoretically inefficient rates, to help maintain an industrial capacity, to hedge against delays or failures in new systems, and to provide a surge production capacity for emergencies.

I am also skeptical about the implication in the memo that the acquisition process suffers from inadequate statements of long range policy, strategy, and resources. In my opinion, the problem has not been that we don't say the right things; it's that after having said them, we don't do them.

I also doubt that the initiatives to delegate more authority to the Service Program managers would survive for long. When programs run into trouble, the temptation for more senior officials to intervene seems to be irresistible. On occasion, we have even had the Secretary of Defense personally involved in weapon development programs.

To enforce better budgetary discipline, Secretary Carlucci's memo also includes initiatives to compel the Services to use realistic costs in their budgets and to certify to the Defense System Acquisition Review Council (DSARC) that they will provide enough funds — even beyond their five-year programs — for each new system. Though I applaud those objectives, I doubt that the Services will actually change their costing practices, and I do not see how they can assure adequate funding far into the future, particularly when their budgets are set by others. I believe that more realistic budgeting and programming is possible, but not through exhortations to the Services.

The memorandum urges that improvement of existing weapons be deliberately funded, and considered as an alternative the development of new systems. I endorse that concept, but it strikes me not so much as an innovation as the usual practice.

There is also an initiative to assure that the government uses appropriate forms of contract to balance program needs, cost savings, and risk-sharing. Again, a good concept, but hardly novel.

And last on the list of initiatives over which I am skeptical is the proposal to obtain legislative authority for the transfer of funds from procurement accounts to RDT&E. My skepticism is not that that could lead to more efficient management and avoid delays in development, but simply that the Congress, particularly in this era of increasily detailed oversight of defense program execution, would concede such authority.

Turning finally to the initiatives with which I take issue, there is a group of four that would delegate more authority for weapons development to the Services. Among them is a decision to cut the number of DSARC reviews of new weapon systems from four to two. The administration's rationale that this would cut the "administrative burden" seems to me to overemphasize a burden that is minuscule in comparison with the scope, commitment, and importance of the major weapon system developments monitored through the DSARC process. The other justification — that decentralization and delegation is intrinsically desirable — is a philosophical matter on which reasonable men can disagree, as I do. In my view, giving the Secretary of Defense only one opportunity to review the program after its initiation and, in effect, to expect him to approve full-scale production well before development — much less operational testing —is completed, is not only a move in exactly the wrong direction, but both unrealistic and unlikely to prevail, no matter what the new directives may say.

I believe that the decision to submit the Mission Element Needs Statements as part of the Service POMs is unwise, in that it entangles the DSARC system with the PPBS system. Because the DSARC considers only a tiny fraction of the elements in the defense budget — a single new kind of hardware — it cannot judge whether that system will be able to compete successfully with all the other things we would like to include in the defense budget. The DSARC merely assures that a new weapon is ready to proceed to the next stage of its development or production, IF funding is available. It is thus — if I may be permitted an analogy — a process of authorization — not appropriation. The "approrpation" process is the PPBS, where competing claims are judged and decided. Mixing the two is, in my opinion, a bad idea. Developing satisfactory MENSs has proven difficult, but burying them away in the PPBS process will only hide the problem — not solve it.

I also disagree with adding the Service Secretaries or Chiefs of Staff as members of the DSARC. The Service Secretaries and Chiefs have always been welcome to attend DSARC meetings and present their views. But to have them become voting members puts them in the position of judging their own proposals.

The second sort of initiative with which I disagree is much less momentous: the proposal to develop standard diagnostic and repair systems to be used on a variety of different weapon systems. That brings to mind the Navy's ambitious Versatile Avionics Test System, or VAST, which sounded brilliant in concept, but proved to have serious disadvantages in practice. Diagnostic gear intended to be a jack of all weapons is liable to end up being an expensive master of none.

My final disagrement is with the decision to leave the Undersecretary of Defense for Research and Engineering (the USDR&E) as the Defense Acquisition Executive. As the committee will recall, matters of production, as opposed to research and development, were formerly the province of the Assistant Secretary of Defense for Installations and Logistics, a position since abolished. I believe the former organization was preferable.

The USDR&E SHOULD be an advocate for new systems and new technology, and that should be his primary field of expertise. But those interests and qualifications are likely to bring with them a particular view regarding the desirability of producing the new weapons that he has just developed. I believe that keeping the USDR&E as the Acquisition Exective tends to undercut the influence that other considerations should have on production decisions:

- whether continued production of existing weapons would be preferable,
- which weapons should be kept and which retired,
- questions of force structure,
- the balance between the longer-term objectives that procurement would support and the shorter-term objectives such as training and readiness that the O&M accounts support,
- manpower issues that also place heavy demands on the Defense budget, and
- a host of issues that span the entire Department of Defense.

I believe that centering the acquisition authority in the research and development manager was ill-advised, and should be reversed.

In conclusion, though I have dwelt more on the issues I oppose than those I support, I do not want to leave the impression of being too critical of Secretary Carlucci's commendable efforts to improve a process that is badly in need of improvement. Please note that my opposition applies to less than one out six of his initiatives, and stems mainly from matters not of fact but of philosophy. I wish the administration well in its moves toward decentralization and delegation, but I predict that the usual problems will inexorably force a return to a somewhat more centralized control.

CONCLUSION

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

> QUESTION 1: "Could you give some specific examples of when the CAIG more accurately analyzed the costs of new weapons systems than the Services?"

RESPONSE: Though I no longer have access to the records of the CAIG, I can recall at least three such examples: the F-18; the HARM (High-speed Anti-Radiation Missile); and the F-15, particularly the F-15's F-100 engine.

> QUESTION 2: "Highly complex weaponry also tends to be more expensive to maintain once deployed. How much of the life cycle costs of a weapon can be attributed to maintenance and logistics expenses on the average? Does DOD tend to overlook this factor in designing new programs and estimating their costs?"

RESPONSE: The fraction of a weapon system's total life cycle cost that can be attributed to maintenance and logistics varies widely, depending on the particular weapon system. Some factors that tend to make that fraction greater are high annual costs (obviously), long service life, ease of manufacture, low research and development costs, and long production runs that tend to lower unit procurement costs. The opposite factors of course tend to lower the share of total cost attributable to maintenance and logistics. Though I suggest you put the question to those who have the data at hand, my impression is that maintenance and logistic expenses generally center around one-half of total life cycle costs, ranging downward to 40% or less and upward to 60% or more.

I believe that the DoD has in the past tended to place rather more emphasis on initial costs than on operating costs, and to too little attention to maintenance and logistics in the broadest sense during the design of new systems. The problems that have now resulted from such practices are sufficiently serious to have attracted attention in this and other committees of the Congress and in the DoD. Whether significant changes in our practices will be the result remains to be seen.

> QUESTION 3: "Are many weapon systems funded which have never had a MENS done on them? Do the services make a good case for the weapons they want and do they adequately consider and describe the threat they want to meet?"

RESPONSE: I do not have access to the statistics on how many weapon systems have been funded (after the announced implementation of A-109, of course) in the absence of an approved MENS. I have no doubt that the DoD can furnish that information. I had the impression when I served in the government, however, that more were funded without an approved MENS than with one. The situation may have subsequently improved.

The adequacy of the case that the Services make for new weapon systems, and the adequacy of their consideration of the threat they want to meet, vary so widely that no categorical answer to the question is possible. Some DSARC presentations by the Services are excellent; others are totally unconvincing.

QUESTION 4: "Why aren't the excessive number of DOD projects cut back to allow for efficient procurements of the really necessary systems as recommended in a 1977 Defense Science Board Study? Why doesn't the Secretary of Defense ensure that all approved weapons productions can be accomplished within the budget and simultraneously ensure that new programs are brought into the production stage in a coordinated fashion?"

RESPONSE: I believe that there at least three reasons why the roster of R&D projects in the Defense Department isn't cut back to an "efficient" number:

First, hope springs eternal. Even though it may seem clear as crystal that funding to assure efficient production of all projects is virtually impossible, people naturally hope that somehow things will work out all right in the end, and are reluctant to kill a system until the last glimmer of hope has finally faded away.

Second, while there are some systems that deserve to be killed in their own right, killing the others is not liable to be so easy for a conscientious decision-maker. Most systems are designed to serve some real military need. Killing them in the interest of procurement efficiency is not without its price in terms of that military need going unfilled. Unfortunately, the line between "really necessary systems" and all the rest is liable to be very subjective, and a matter on which opinions can vary widely.

Third, it isn't really possible to plan a totally orderly R&D program in which each system will be assured of an efficient level of funding precisely when needed upon graduation from the development process. One can only guess at which systems will fail during the that process, and which ones will take longer to develop than originally planned, and how long those delays will be, and which ones will end up costing more than originally planned, and how much more. When those guesses prove wrong, and some or all of them will, the neatly planned program begins to unravel. It may well be that the R&D program can be better planned than it has been in the past, but I caution against underestimating the difficulty in trying to bring a fine degree of order to an inherently uncertain process.

I do not mean to imply from the above that any better matching of the R&D and procurement programs is impossible; improvement is always possible. I merely wish to note some of the reasons why it has proved so difficult in the past, and probably will continue to prove difficult in the future.

Chairman ROTH. The committee is in recess.

[Whereupon, at 12:40 p.m., the committee was recessed to the call of the Chair.]

ACQUISITION PROCESS IN THE DEPARTMENT OF DEFENSE

TUESDAY, OCTOBER 27, 1981

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, D.C.

The committee met at 9 a.m., in room 3302, Dirksen Senate Office Building, Hon. William V. Roth, Jr. (chairman of the committee), presiding.

Present: Senators Roth, Cohen, Mattingly, Rudman, Pryor, Sasser, and Levin.

OPENING STATEMENT OF SENATOR ROTH

Chairman ROTH. The committee will be in order.

I am happy to welcome here today the Deputy Secretary of Defense, Mr. Carlucci.

I have an opening statement which I will include in the record as read, if there is no objection.

[The statement follows:]

STATEMENT OF SENATOR ROTH

We convene today for the second in our series of hearings on the acquisition process in the Department of Defense. As I said in my opening statement before our first hearing last week, the acquisition of goods and services is one of the Department's most complicated and expensive activities. In fiscal year 1980 alone, more than 83 billion dollars was spent on DOD procurements, everything from lightbulbs to building repairs to multimillion dollar jet fighters were purchased through these procurements.

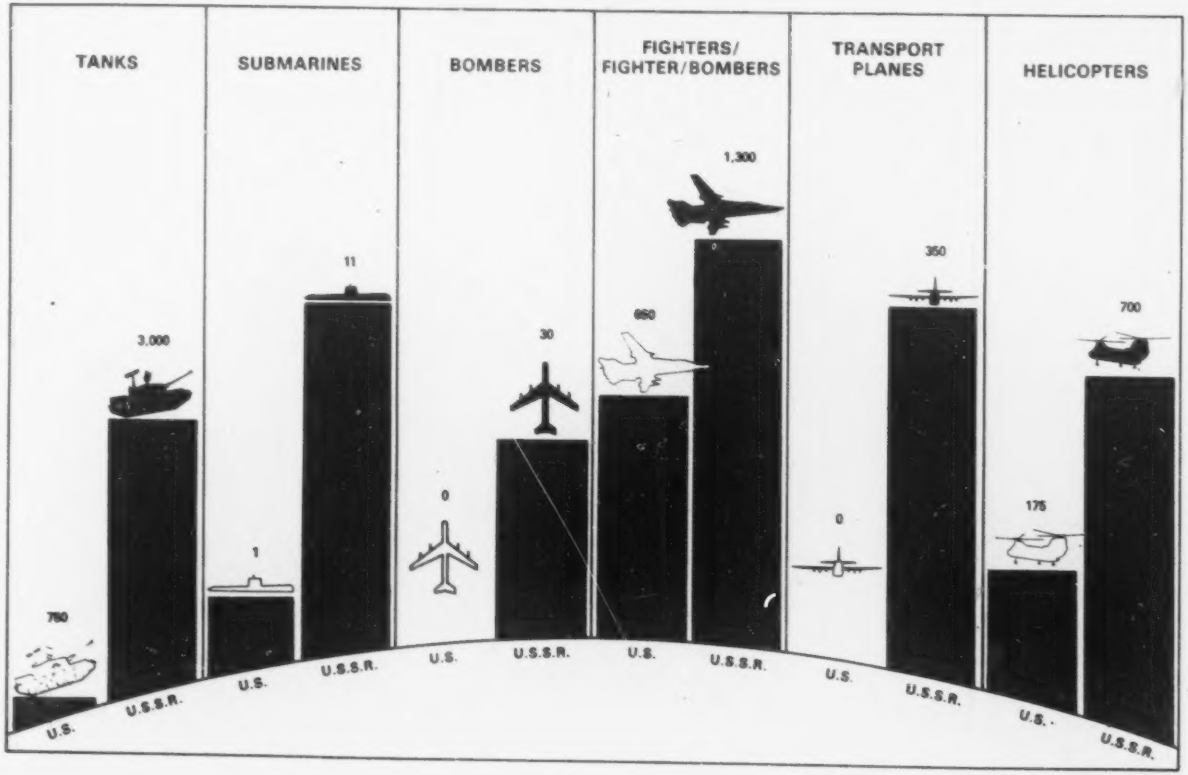
Obviously, the acquisition process is a vital linchpin in our overall defense effort. It is through this process that we buy the modern military equipment we need to assure that our defensive capabilities are reliable and effective. It is through this process that we theoretically at least, supply our troops, with the best equipment money can buy at a price that we can afford. If we fail to maintain a cost-effective, innovative and highly productive capability to acquire needed military equipment, we are neglecting our duty to provide our citizens with a safe, secure nation.

The American people believe that we do need to strengthen our defensive capabilities. A national survey conducted by the Washington Post a few days ago revealed that nearly half of those questioned believe we should spend whatever is necessary to maintain military equality with the Soviet Union. Forty percent believe we should spend enough to maintain superiority over the Soviets. Americans clearly realize that we have too long neglected our national defense and have too long allowed our military services to decline in quality. They support increased expenditures on our Armed Services to beef up the nation's defenses.

This national consensus, however, will quickly turn to outrage if the taxpayers see too many more defense dollars going to pay for cost overruns, delays and gold-plated "tin lizzies" instead of effective military equipment. If we don't do something soon to reduce the staggering costs of the acquisition process, we will not only lose the support of the public, but we will also find that we have become our own worst enemies. As I pointed out last week, the Russians have consistently out-produced us in recent years in terms of numbers of weapons produced. My concern is that we have been engaging in a kind of gold-plated unilateral disarmament even without a Salt agreement. In general, we have been spending more money and have less to show for it. This chart illustrates the problem.

COMPARISON OF U.S., SOVIET WEAPONS PRODUCED

(FISCAL YEAR 1980)



How well we spend the additional dollars new being devoted to defense is crucial. We can't buy the jets, tanks and ships we need when the costs of these items are increasing faster than the rate of inflation. We can't effectively add new defensive capabilities when it takes more than 10 years on average to develop and deploy a new weapons system. We can't improve the quality of our defense force in a timely way when we are shackled by a paperwork chain of some 40,000 Department of Defense specifications lodged in 80 DOD offices. We can't, in short, buy what we need, when we need it, at a reasonable price, if we don't have an efficient, well-managed acquisition process.

The Committee has already heard testimony from several witnesses outlining some of the problems affecting the acquisition process. In my opinion, one problem stands out, perhaps more than any other, as a major cause of inefficiency in DOD acquisitions: the failure to use competitive bidding.

The President himself has been a strong advocate for injecting new strength into the free market principle of competition. Yet, fully two-thirds of the value of all Department of Defense procurements are noncompetitive—that is, they are not open to bidding by all interested parties. Of a total of $62.1 billion in contracts awarded by DOD in fiscal year 1979, almost $40 billion was negotiated without competition. In effect, DOD is running an auction without a caller and with only one participant—who is admitted by special invitation only.

We must ensure greater competition in DOD procurement for several reasons besides the need to cut costs. For one thing, the fondness of DOD for sole-sourcing its acquisition of goods and services may be having a serious effect on our military-industrial base. The practice of sole-sourcing may contribute to reducing the number of firms willing to bid on DOD projects by shutting out innovative smaller firms. For instance, only 25 firms now hold approximately 50 percent of all Defense contracts, and only 8 firms conduct 45 percent of all Defense research. Significantly, some 2,000 Aerospace Industry Subcontractors went out of business between 1968 and 1975. Many of them were unique suppliers of critical defense components.

It is entirely possible that excessive use of sole-source contracts by DOD was the last nail in the coffins of many of these contractors. By refusing to open up the DOD market place to competition, we may be forcing many companies to fold or refuse to contract for Defense projects, thereby reducing further any opportunity for competition.

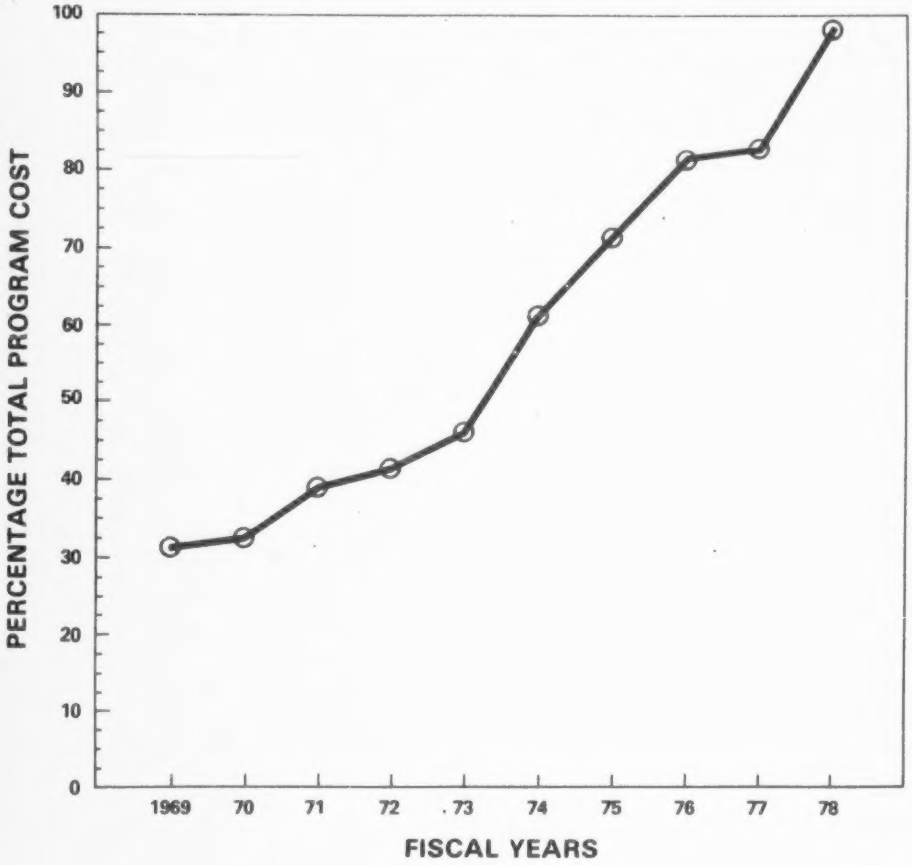
There is little doubt that costs can be reduced through greater use of competitive contracts by DOD. Some studies suggest that as much as 30 percent of the DOD procurement budget can be saved through more competition in the acquisition process. One analyst, for example, has estimated that competition and the elimination of detailed "specs" saved $640 million on the procurement of specialized ammunition for the A-10 aircraft. The Defense Science Board examined more than a dozen examples of competed contracts for weapons such as the AIM-7 missile and found significant evidence of cost savings, with an average savings of nearly 15 percent. The DSB concluded, "Competition is a powerful motivator for cost control."

Yet, with all this evidence before it, DOD continues to fail to use the forces of the market place to reduce costs. DOD claims that it is difficult to use competitive contracts in many cases—yet, as the Defense Science Board noted, there is "very little definitive evaluation by DOD on the real cost value of competition." In other words, DOD says it can't stand the taste of the medicine it needs, even though it hasn't tasted it yet.

Without competition in acquisition, there are virtually no incentives for the contractor, or for DOD itself, to reduce costs. DOD is helping to create a new hothouse variety of defense plant—a favored group of companies that flourish in the warm glow of monopoly contracts. There may be some rivalry during the initial phases of an award for research and development, but even then the competitors often fight with kid gloves, and the referee won't let anyone get hurt. In the end, one firm becomes the sole developer and producer of a weapon for a decade or more.

Competition in DOD programs isn't the only technique available for cutting costs, but it is certainly one of the more important. Unnecessary costs must be brought under control soon. The American people will not stand much longer for the kind of cost overruns we have experienced in the past decade. [See chart which follows.] More dollars must not mean more unnecessary expenses. Even now, Congress is considering scaling back the increases in Defense spending originally proposed by the President. Without visible, effective and lasting reforms in DOD's efforts to buy more systems, the clamor for more Defense cuts will only get louder and more strident. In these hearings today, we intend to see how the Department is responding to this challenge.

DEPARTMENT OF DEFENSE SYSTEMS TREND ON COST OVERRUNS



Chairman ROTH. I would like, Mr. Carlucci, to make a few observations prior to hearing your testimony.

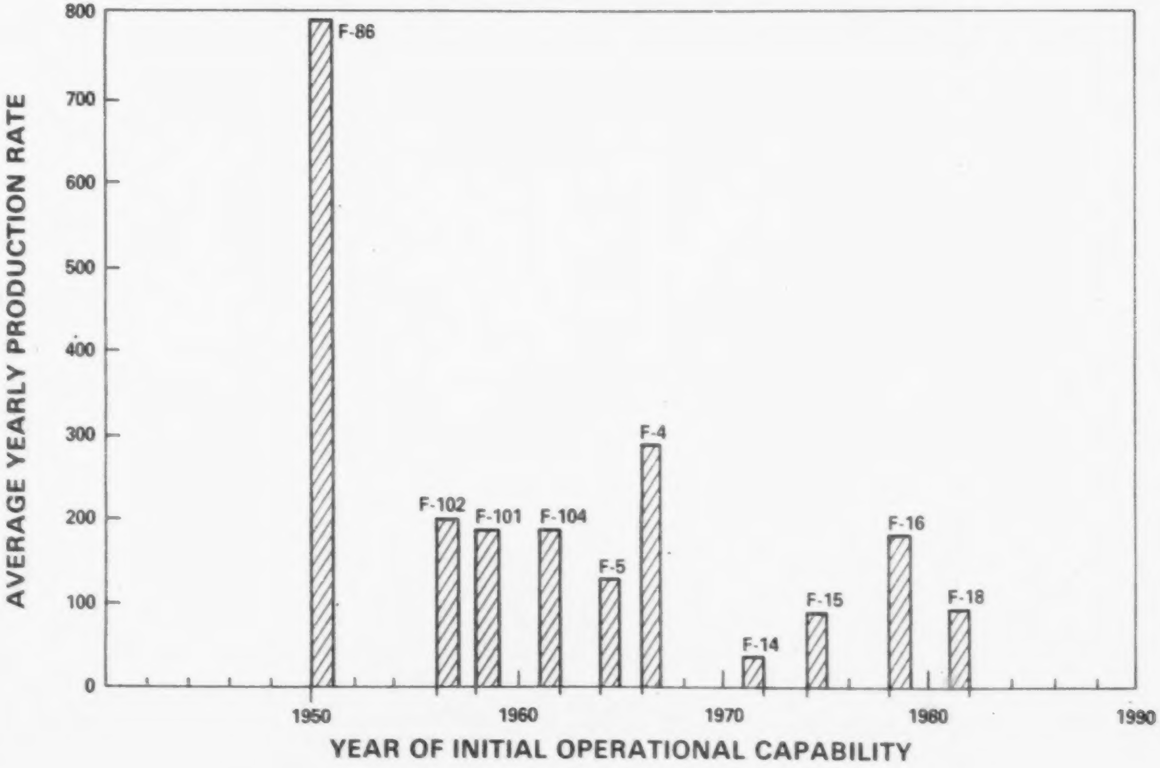
First, let me say that in my judgment there is no question that our defense posture is in disarray because of past policy. There is no more important question than what we must do to meet the challenges of the Soviet buildup.

I can also say that from my observations, at home in Delaware, there is no question that there is broad support among the American people for this defense effort. I find that the Washington Post's recent poll appears to be substantially correct when they find nearly half the American people support the effort to meet, on a quality basis, the Soviet challenge, with only 40 percent of those wanting numerical superiority.

At the same time, I am greatly concerned, Mr. Carlucci, about our maintaining this consensus of the American people in the future because I think too often we have seen the hills and the valleys of public support in this area.

Let me express why I have some of these concerns. Despite the general support, I think there is a growing perception among the people that we seem to be adopting an open-door policy to the U.S. Treasury with respect to defense spending at the very time we are closing the door on domestic expenditures. Thoughtful people, I find, are asking me at home, "Why is this necessary?" There seems to be a growing perception that the United States is procuring what some call too many gold-plated systems, and as a result, as illustrated in that chart to the right, we are purchasing fewer weapons at greater costs.

TREND OF DECREASING YEARLY PRODUCTION RATE OF FIGHTER AIRCRAFT



Chairman Roth. Mr. Carlucci, when I became chairman of this committee, I decided one of the primary thrusts of it would be to guard against waste and fraud in the Government, and we intend to do just that, whether it be in domestic programs or in the Department of Defense.

And I would hope and urge you to guard against waste and fraud because, in my judgment, it will only take a few scandals to turn people off on defense expenditures. I will have to say in all candor that I find it difficult to understand, for that reason, why the Defense Establishment does not enthusiastically support the creation of an independent Inspector General. I also have to say that I find it difficult to understand why there seems to be such DOD opposition to Senator Nunn's proposal, who is a member of this committee, and certainly one of the most learned Members of Congress in the defense area, to require certain actions on overruns.

I say I am concerned about these because I do not think it will take very many scandals to turn an awful lot of people off.

I would also like to say that it is a matter of concern to me that competition in procurement has dropped off by 8 percent during the 1970's.

As you know, there are those who estimate, perhaps guesstimate, that real competition can mean savings as high as 30 percent, but I will have to say in all candor that I do not see any emphasis, any thrust to maximize competitive bidding, despite the fact that the law does establish this as the principal means for defense procurement. There is too much reliance on the exemptions to competition in DOD procurement.

One of my concerns in this area, Mr. Secretary, is that when you purchase on a sole-source basis, there doesn't seem to be very many incentives for cost savings on the part of the sole supplier.

I would also point out that I have some reservations about delegating too much authority to the services, I am convinced that we can achieve savings through consolidated purchases. I am also concerned about the speculation, and I hope that that is all it is, that defense policy is to get the equipment as fast as possible, regardless of cost. I happen to think performance, schedule, and cost are all equally important.

Now having said all that, I would just like to say I, for one, believe that this Nation is fortunate in having the defense establishment headed up by two most capable public servants, Casper Weinberger and yourself. And I just want you to know there is at least one U.S. Senator who believes strongly in meeting the Soviet threat, but also hopes that the Secretary will continue to be known as "Cap the Knife."

I believe we need people at the Department of Defense who will be called the watchdog of the U.S. Treasury.

I would like to insert into the record at this point prehearing questions which were given to Secretary Weinberger and his responses to those questions.

[The information referred to follows:]

1981 OCT -1 AM 7:42

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THE SECRETARY OF DEFENSE

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United States Senate
COMMITTEE ON
GOVERNMENTAL AFFAIRS
WASHINGTON, D.C. 20510

September 28, 1981

The Honorable Caspar Weinberger
Secretary
Department of Defense
Room 3E880
The Pentagon
Washington, D.C. 20301

Dear Mr. Secretary:

As you know, the Governmental Affairs Committee will convene hearings in October on the management of the acquisition process in the Department of Defense. Our hearings will cover a range of problems which have affected the acquisition process over the years including inaccurate cost estimates for new weapons systems, the costs of "stretch outs" of existing weapons procurements, the effects of excessive technological complexity on weapons costs and ineffective quality assurance controls in DOD procurement activities. The Committee intends that these hearings provide useful information to the Congress, members of the defense community and the general public. We look forward to the cooperation of the Defense Department in this endeavor.

In the course of organizing for these hearings, we have determined that certain information from DOD is necessary and will greatly aid the Committee in preparing for its examination of DOD acquisitions management activities. Accordingly, we request that the information described below be made available to the Committee as soon as possible.

The information we would like to have is as follows:

1) The reliability intended to be designed into a system is often not being achieved in the field. Unreliable equipment is expensive to repair and maintain. It is the task of quality assurance to help minimize reliability problems. However, there appears to be a serious staffing shortfall in the quality assurance function at OSD where our information is that only one person is devoted to the policy aspects of quality assurance. There is evidence that DOD policies concerning quality assurance (particularly DOD Directive 4155.1) are not being implemented effectively and that program managers are not receiving guidance from OSD on how to assure reliability in weapons procurements. Please describe what DOD has done or is preparing to do to remedy this problem.

2) The majority of the DOD quality assurance task force has had little training in quantitative analysis or design desciplines, according to information received by the Committee, and often lacks the technical expertise to deal with complex systems. This work force has been decreased 45 percent over the last 10 years while increased complexity and number of contracts has driven the workload requirements up. Are these facts accurate? Please describe how DOD is attempting to rectify this problem.

3) In 1977, DOD developed proposed guidelines, to be incorporated in the Defense Acquisition regulations, which defined lobbying for purposes of determining which costs a contractor may charge to the government. Although a great deal of work was done on developing the definition, it was never adopted and our current information is that there are no plans to do so. Have there been any further efforts to develop a definition of lobbying for procurement transactions which could guide auditors and program managers in determining what is an allowable cost?

4) The professionalism of the procurement work force is imperative in assuring effective and efficient government purchases. The age and retirement potential of the present work force, the planned increase in defense procurement and the high mobility of program managers and contract officers all affect the quality of contract and procurement personnel. What percentage of the DOD procurement workforce is expected to retire next year? What is currently the average length of time spent by program managers and contract officers in their positions? Have the GS ratings for procurement personnel been lowered recently by the Office of Personnel Management and if so, what effect might this have on the morale of DOD procurement officers?

5) How many programs does the DOD currently have in the program initiation stage? How many in the demonstration and validation stage? How many in the full-scale engineering development stage? How many in the production and development stage? How much money is allocated to programs in each of these stages for FY81 and what percent of the total procurement budget does each stage represent?

6) Some analysts contend that a major problem in managing the DOD is the rapidly decreasing size of its civilian work force. Please provide the Committee with figures on the growth of this work force from 1960 through the upcoming fiscal year (1982). How many of these personnel work in the procurement area in DOD and in what capacities (i.e. contract officer, systems analyst)? How many military personnel work in the procurement area within DOD?

7) In the F-15, F-16 and A-10 programs, to use three well known examples, increasing lead times for production of

these aircraft has been a serious problem. The F-15 has gone from a lead time of 36 months in 1977 to 41 months in 1980; the F-16 went from a lead time of 28 months in 1977 to 42 months in 1980; and the A-10 went from a lead time of 29 months in 1977 to 49 months in 1980. The Committee would appreciate figures on what these lead time increases have meant in terms of increased costs per airplane procured. In other words, for each of the planes listed, how much will the stretched out lead time affect the costs of the airplane (in FY82)?

8) How many former Department of Defense military officers, as well as past DOD civilian employees of equivalent rank, now work for defense contractors? Please distinguish among the individual services. For former Generals and Colonels, please furnish the Committee with the current positions of these officers in their private sector jobs.

9) According to a recent report of the House Government Operations Committee (House Report 97-71, Part 3), the majority of fiscal 1980 Defense Department contracts were awarded on a non-competitive basis. At a hearing before the Armed Services Committee on July 28, 1981, however, Secretary Carlucci testified that 56 per cent of all FY 80 DOD contracts were competitively bid and that, for the first six months of 1981, 69 per cent were competitive. Please explain what categories of contracts are included in the Department of Defense's statistics on competitive contracts, and provide the Committee with the percentage and dollar amount of competitive contracts awarded in each of fiscal 1978, 1979, and 1980. What percentage of contracts was awarded on the basis of price competition during the same period and during the first six months of this year? Does DOD plan to set a target percentage figure of its total procurement budget which it will attempt to let on a competitive basis for FY82? If so, will this percentage target be increased in coming years?

10) In the report referred to in question 9 above, actual estimating error accounted for 12 per cent of the cost variances between DOD's preliminary and current estimates. What percentage of the estimating changes for weapon systems listed in the fiscal 1979 and 1980 Selected Acquisition Reports is accounted for by: (1) the correction of error in preparing the preliminary estimates, or (2) a change in program or cost estimating assumptions and techniques not provided in the other categories?

11) What is the degree of concentration in the defense industrial base at the prime contractor and the subcontractor level? Within which sector of the industrial base is the concentration the highest? Is this a recent occurrence or has concentration always been highest in that sector?

12) The Carlucci memorandum addresses the issue of excessive time delays in the DOD acquisition process. Does the Defense Department have an established time frame, possibly between the specific milestones, within which it works to procure weapon systems?

13) In Deputy Secretary Carlucci's memorandum of April 30, 1981, regarding changes needed in defense acquisition, recommendation number 4 cited 18% as the estimating change component of cost growth for the 47 major programs covered by the December 31, 1980 Selected Acquisition Report. We understand that the 18% represents changes in estimated costs from Milestone II of the acquisition process. With regard to the 18% figure, please provide responses to the following:

a. For fiscal year 1981, how much of the estimating error cost growth was borne by DOD (in current dollars)? How much was borne by contractors? Please specify approximate costs to both, and provide a breakdown showing the Government/contractor estimating cost growth for the five weapons systems in which the greatest cost growth occurred (if any or all of the five are classified, please provide this breakdown for estimating cost growth for the five highest growth unclassified weapons systems). Please note that the estimating change figures should not contain figures representing inflationary growth.

b. In how many of the weapons systems was the acquisition in the production stage? In how many was the acquisition in the full scale development stage (of the 47 major systems covered by the SAR)?

c. For all unclassified weapons systems of the 47 covered by the SAR, please provide an approximate cost breakdown of the reasons for estimating change, i.e. how much was attributable to unforeseen wage changes, etc?

d. For all of the major weapons systems in the production stage, what types of contracts, with prime contractors, are being utilized (please specify Firm Fixed Price (subject to no price change whatsoever), Fixed Price with Economic Price Adjustment, Fixed Price Incentive Fee, Cost Plus Incentive Fee, etc.)? In what stage of production is each acquisition?

14) In regard to Recommendation number 2 in Deputy Secretary Carlucci's April 30, 1981 memorandum, how many weapons systems have been targeted for application of the pre-planned product improvement approach during FY '82? What is the estimated dollar savings for FY '82 that will result from the application of this approach?

15) Please respond to the following questions concerning competition:

a. Please provide the Committee with all citations to existing regulatory and statutory requirements concerning competition in defense procurement.

b. What DAR regulations serve to promote competition by prime contractors in the procurement of goods and services from subcontractors? Please provide the Committee with citations to the appropriate regulations or guidance documents.

16) Two areas of DOD contracting of particular interest to the Committee are follow-on after price competition and follow- on after design or technical competition.

a. How do you determine that it is appropriate to continue awarding contracts to an encumbent vendor after an initial price competition for a particular product? Does that determination take into account that other vendors may be able to provide the product at a lower price? Does the follow-on after price competition method of contracting satisfy statutory requirements for formal advertising?

b. Similarly, how do you determine it is appropriate to award sole source follow-on contracts for production to a contractor who has won an earlier design or technical competition for a major system, when it is possible that other contractors could produce the system at a lower cost?

c. What are the potential disadvantages or negative consequences to the government of seeking competition on subsequent contracts after initial price competition and of seeking competitive bids on production contracts?

17) The Carlucci memoranda of April 30, 1981 and July 27, 1981 contains thirty-two initiatives designed to improve and increase the effectiveness of the acquisition process. Several of them, for example, the initiative concerning enhanced competition in the acquisition process, have been viewed as important methods of saving substantial amounts of federal funds. While the Carlucci memorandum does contain many important ideas, there is less confidence than there should be that the policies in the memorandum can actually reduce costs and improve the weapons procurement process. This perception, especially on the part of the public, is in part due to the fact that there is no hard data on which to judge the potential effects of the Carlucci memorandum. Are there any estimates as to how much money, staff time or lead time (in various weapons procurements) will be saved through full implementation of the memorandum? If not, how did the Department decide which issues were important enough to include as part of the Deputy Secretary's memoranda? The Committee believes this matter is very important and would appreciate all efforts to respond to these questions.

18) One of the most highly publicized instances of inadequate quality control has been in Electric Boat contracts on the Trident and SSN 688 submarines. Navy witnesses have testified that the problems has now been resolved. Please indicate the reasons for the initial difficulties as well as the corrective actions that have been taken.

We greatly appreciate your assistance, and that of your staff, in helping our Committee to prepare for the hearings. If there are any questions or concerns you have after reviewing this letter, please let me know. My staff assistant, Mr. Link Hoewing, is prepared to assist you in any way possible and he may be reached at 224-4751.

I sincerely thank you, in advance, for your cooperation in this request.

Sincerely,

Bill Roth

William V. Roth, Jr.
Chairman

WVR/jlm

OFFICE OF THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

19 OCT 1981

Honorable William V. Roth
Chairman
Senate Committee on Governmental
  Affairs
3306 Dirksen Senate Office Building
Washington, D.C. 20510

Dear Mr. Chairman:

I have been asked to respond to your recent letter to Secretary Weinberger indicating that the Governmental Affairs Committee will convene hearings this month on management of the acquisition process in the Department of Defense.

Attached is the information you asked us to provide on a range of issues that have affected our development and procurement processes over the years.

Sincerely,

William A. Long

William A. Long
Deputy Under Secretary
(Acquisition Management)

Attachment
a/s

ATTACHMENT

Question 1: The reliability intended to be designed into a system is often not being achieved in the field. Unreliable equipment is expensive to repair and maintain. It is the task of quality assurance to help minimize reliability problems. However, there appears to be a serious staffing shortfall in the quality assurance function at OSD where our information is that only one person is devoted to the policy aspects of quality assurance. There is evidence that DoD policies concerning quality assurance (particularly DoD Directive 4155.1) are not being implemented effectively and that program managers are not receiving guidance from OSD on how to assure reliability in weapons procurement. Please describe what DoD has done or is preparing to do to remedy this problem.

Answer: The problem of assuring proper reliability in our fielded equipment has received considerable attention. Policy directives issued over the past two years on the subject of weapon system acquisition added increased emphasis to this subject. These policies included not only the DoD Directive on Major Systems Acquisition, DoDD 5000.1, and DoD Instruction on Major Systems Acquisition Procedures, DoDI 5000.2; but also a completely revised directive on the Acquisition and Management of Integrated Logistics Support for Systems and Equipment, DoDD 5000.39, and the new directive on Reliability and Maintainability, DoDD 5000.40.

These policies, that were issued in late 1979 and in 1980, were recognized by the GAO as major efforts to address the support and reliability problems. This is reflected in GAO Reports PSAD-81-17 and MASAD-81-25. In this latter report the GAO reported that these changes "clearly emphasize the importance of supportability factors, including R&M, in the acquisition cycle."

More recently, the actions directed on 30 April 1981 by Deputy Secretary Carlucci to improve the acquisition process continue to address the need for weapon systems that meet our reliability and support objectives when fielded. Among the 32 actions directed by the Deputy Secretary are:

Action #9, "Improve System Support and Readiness"
Action #12, "Provide Adequate Front End Funding for Test Hardware"
Action #16, "Contractor Incentives to Improve Reliability and Support"
Action #30, "Program Manager Control over Logistics and Support Resources"
Action #31, "Improving Reliability and Support for Shortened Acquisition Cycle"

These actions are being aggressively pursued by OSD and the Services and the policies for weapons system acquisition will be changed to reflect these improvements. As a result of these actions Program Managers will have improved guidance on the conduct of reliability and maintainability activities. We will continue to provide emphasis on these subjects and assure that the best approaches to solving these problems are available and used by the Program Managers.

The statement that only one person is devoted to the policy aspects of quality in OSD is correct. While it may be desirable to provide additional resources to this function, our scarce resources have been distributed as equitably as possible. Nevertheless actions on the quality assurance problems cited in your letter and reflected in GAO Report PSAD 81-17 are being monitored effectively.

DoD Components have developed implementing documents in support of DoD Directive 4155.1, "Quality Program." The DoD Components point out that they have and are effectively implementing their quality programs. OSD is currently taking briefings from the Military Services and Defense Logistics Agency as a follow-up to assure implementation. Two of these briefings (Army and Air Force) have already taken place.

We recognize the need for influencing systems design for quality to assure that quality characteristics are considered during the design process. In order to assure consistency in application, OSD is developing, through contract, a design review handbook for use by DoD Components for the design review of major systems for quality characteristics. This contract should be completed by January 1982 and the document implemented shortly thereafter.

A task to establish contractor quality history files had not been fully implemented at the time of the GAO Report PSAD 81-17. However, this task is now well underway and should be completed by February 1982.

The cross-Service product deficiency reporting system which was cited by the GAO has been implemented manually, but we are continuing our efforts to automate the program. So far only the Army and the Air Force have automated systems which work effectively. The Army is leading an ad hoc team to complete the system for DoD.

Question 2: The majority of the DoD quality assurance task force has had little training in quantitative analysis or design disciplines, according to information received by the Committee, and often lacks the technical expertise to deal with complex systems. This work force has been decreased 45 percent over the last 10 years while increased complexity and number of contracts has driven the workload requirements up. Are these facts accurate? Please describe how DoD is attempting to rectify this problem.

Answer: These statements are basically true, however, the work force is being continually trained and a career program was developed and published in 1980. Specific training is given where needed; however, the primary problem of training is being addressed by the Defense Quality and Reliability Career Management Board to improve the professionalism of the quality assurance work force.

DoD has considerable difficulty competing in the market place for engineers because industry has significantly higher starting salaries for college graduates and rapid promotion. Our quality intern programs suffer severe shortages. Interns are needed to improve the professionalism and replace much of the aging work force. Over the next three years 1/3 of the Q&RA work force will be eligible for retirement with approximately 50% becoming eligible over the next 5 years. As the GAO noted, the QA work force needs strengthening because of a shortage of engineers to perform design reviews and assessments for quality. There has been a need to convert some spaces for this purpose. This has not been accomplished because of a shortage of manpower spaces. It is estimated DoD needs 792 additional spaces for this purpose.

Question 3: In 1977, DoD developed proposed guidelines, to be incorporated in the Defense Acquisition Regulations, which defined lobbying for purpose of determining which costs a contractor may charge to the government. Although a great deal of work was done on developing the definition, it was never adopted and our current information is that there are no plans to do so. Have there been any further efforts to develop a definition of lobbying for procurement transactions which could guide auditors and program managers in determining what is an allowable cost?

Answer: On 1 October, Secretary Weinberger directed that a cost principle be incorporated into the Defense Acquisition Regulation that would make the cost incurred by contractors in connection with lobbying activities associated with the appropriation of procurement funds unallowable under DoD contracts.

Question 4: The professionalism of the procurement work force is imperative in assuring effective and efficient government purchases. The age and retirement potential of the present work force, the planned increase in defense procurement and the high mobility of program managers and contract officers all affect the quality of contract and procurement personnel. What percentage of the DoD procurement work force is expected to retire next year? What is currently the average length of time spent by program managers and contract officers in their positions? Have the GS ratings for procurement personnel been lowered recently by the Office of Personnel Management and if so, what effect might this have on the morale of DoD procurement officers?

Answer: As of June 1981, 14 percent of our procurement work force was eligible for optional retirement. Average retirements for government employees has been running at 50 percent of those eligible. Therefore, it is expected that 7 percent of our procurement work force will retire by June 1982.

In order to determine the average time of program managers and contracting officers in their current positions would require an extensive analysis. However, 67 percent of our civilian work force of GS-13s and above in the procurement field are 45 years old and above indicating that they have extensive experience in their field.

The GS ratings for procurement personnel have not been lowered. However, OPM has proposed new classification standards for contract and procurement series GS-1102. These standards are being tested by DoD and other government agencies. Preliminary indications are that without substantial modification these proposed standards would result in significant downgrading of procurement positions. In our opinion, such action would have a devastating impact on the morale of DoD procurement officers.

Question 5: How many programs does the DoD currently have in the program initiation stage? How many in the demonstration and validation stage? How many in the full-scale engineering development stage? How many in the production and development stage? How much money is allocated to programs in each of these stages for FY 81 and what percent of the total procurement budget does each stage represent?

Answer: DoD currently has five major weapon systems in the concept exploration phase; twelve major weapon systems in the demonstration and validation phase; sixteen major weapon systems in the full-scale development phase; and thirty-one major weapon systems in the production and deployment phase. The latter two groups are reported to Congress in the Selected Acquisition Reports (SARs) whereas the former two groups are potential SAR programs. The FY 81 budget is allocated among these programs as follows: $26M for those in the concept exploration phase, $964M for those in the demonstration and validation phase, $2.43B for those in the full-scale development phase, and $21.62B for those in production and deployment phase. These major systems represent approximately 18 percent of the total FY 81 R&D budget and approximately 46 percent of the total FY 81 procurement budget.

Question 6: Some analysts contend that a major problem in managing the DoD is the rapidly decreasing size of its civilian work force. Please provide the Committee with figures on the growth of this work force from 1960 through the upcoming fiscal year (1982). How many of these personnel work in the procurement area in DoD and in what capacities (i.e., contract officer, systems analyst)? How many military personnel work in the procurement area within DoD?

Answer: Attached (Tab A).

Question 7: In the F-15, F-16 and A-10 programs, to use three well known examples, increasing lead times for production of these aircraft has been a serious problem. The F-15 has gone from a lead time of 36 months in 1977 to 41 months in 1980; the F-16 went from a lead time of 28 months in 1977 to 42 months in 1980; and the A-10 went from a lead time of 29 months in 1977 to 49 months in 1980. The Committee would appreciate figures on what these lead time increases have meant in terms of increased costs per airplane procured. In other words, for each of the planes listed, how much will the stretched-out lead time affect the costs of the airplane (in FY 82)?

Answer: The Air Force informs us that the cost impact of lead time stretch-out is entirely the delay penalty of inflation.

Question 8: How many former Department of Defense military officers, as well as past DoD civilian employees of equivalent rank, now work for defense contractors? For former Generals and Colonels, please furnish the Committee with the current positions of these officers in their private sector jobs.

Answer: In accordance with Section 410(d) of Public Law 91-121 (83 Stat. 212) a by fiscal year report is filed with the President of the Senate and the Speaker of the House of Representatives that identifies certain military and civilian individuals who are employed by contractors awarded negotiated contracts of $10M or more. Enclosed (Tab B1-B3) is a copy of the fiscal year 1979 initial and supplemental report, and the fiscal year 1980 initial report. Unfortunately, the compilation of the fiscal year 1980 supplemental report has not been completed. The specific grades and civilian positions of those filing are included in the reports provided to the President of the Senate.

Question 9: According to a recent report of the House Government Operations Committee (H.R. 97-71, Part 3), the majority of fiscal year 1980 Defense Department contracts were awarded on a non-competitive basis. At a hearing before the Armed Services Committee on July 28, 1981, however, Secretary Carlucci testified that 56 percent of all FY 80 DoD contracts were competitively bid and that, for the first six months of 1981, 69 percent were competitive. Please explain what categories of contracts are included in the Department of Defense's statistics on competitive contracts, and provide the Committee with the percentage and dollar amount of competitive contracts awarded in each of fiscal 1978, 1979, and 1980. What percentage of contracts was awarded on the basis of price competition during the same period and during the first six months of this year? Does DoD plan to set a target percentage figure of its total procurement budget which it will attempt to let on a competitive basis for FY 82? If so, will this percentage target be increased in coming years?

Answer: Contract awards are categorized as follows:

Price Competition - two or more offers were received and award was made to the lowest responsive and responsible offeror.

Technical and Design Competition - two or more offers were received and award was made to the offeror with the best overall technical and design proposal. Cost is usually one of the factors in the evaluation.

Follow-on After Price Competition - contract award for the same item to a source initially established in a prior year based on price competition.

Follow-on After Technical and Design Competition - contract award for the same item to a source initially established in a prior year based on technical and design competition. For example, F-15, F-16, and M-1 weapon system production contracts flow to sources initially established in a prior year based on technical and design competition. For example, F-15, F-16, and M-1 weapon system production contracts flow to sources initially established in technical and design competition.

One Source - single-source awards because there is only one source--e.g., Trident missile, aircraft carrier, etc.--or no competitive offers were received. In this latter case, for example, since the oil embargo of October 1973, DoD has been largely unable to obtain competitive offers for its petroleum requirements. Petroleum is now in some supply, and the situation has changed in FY 1981.

Catalog/Market Price - contract award based on catalog or marked prices established in the commercial market place.

Competition versus Noncompetition statistics are shown at Tab C.

Our objective is to increase meaningful competition. DoD purchases a broad range of supplies and services with opportunities for increasing competition subject to many varying circumstances. For many major systems currently in production, the source selection was made some years ago, and the annual production requirements will continue to be placed with these selected sources. We believe it more appropriate that DoD Components establish objectives for achieving competition at command and buying activity level. In our opinion, a DoD-wide composite target would not be meaningful. Enhancing competition is a long-range objective to be pursued over future years.

Question 10: In the report referred to in question 9 above, actual estimating error accounted for 12 percent of the cost variances between DoD's preliminary and current estimates. What percentage of the estimating changes for weapon systems listed in the fiscal 1979 and 1980 Selected Acquisition Reports is accounted for by: (1) the correction of error in preparing the preliminary estimates, or (2) a change in program or cost estimating assumptions and techniques not provided in the other categories?

Answer: As defined in the SAR instructions, correction of errors in preparing the baseline estimate applies to inadvertent errors. Such corrections would be very rare. None of the estimating changes displayed in the FY 1979 and FY 1980 SARs are believed to contain such corrections. In general, all estimating changes reflect refinements of prior estimates, changes in cost estimating assumptions or techniques, and program changes not provided for in the remaining variance categories.

Question 11: What is the degree of concentration in the defense industrial base at the prime contractor and the subcontractor level? Within which sector of the industrial base is the concentration the highest? Is this a recent occurrence or has concentration always been highest in that sector?

Answer: Prime contract awards over $10,000 in FY 1979 were $64.7B and in FY 1980 we awarded $76.8B in contracts. The list of defense industry sectors that receive the largest portion of our contracts in descending order are aircraft, electronics and communications equipment, missile and space systems, and ships.

Commitments for subcontract work by 1,023 reporting large military contractors were $25.499B in fiscal year 1980, which is a 20 percent increase from the $21.245B reported by 832 large contractors in fiscal year 1979. It should be noted that small business concerns received $13.588B in awards in FY 1980 an increase of $1.417B over FY 1979.

Question 12: The Carlucci memorandum addresses the issue of excessive time delays in the DoD acquisition process. Does the Defense Department have an established time frame, possibly between the specific milestones, within which it works to procure weapon systems?

Answer: The revised Department of Defense Directive 5000.1 on Major System Acquisition, which implements the 30 April 1981 Carlucci Initiatives, recognizes that each major weapon acquisition is unique and therefore encourages tailoring and flexibility of the acquisition strategy. Programs are to be executed with innovation and common sense. To minimize the length of the acquisition cycle we stress in this directive that consideration be given to several time-saving approaches such as lead-time reduction, experimental prototyping of critical components, combining development phases, omitting development phases, preplanned production improvement (P3I), and utilization of additional units for test. We do not have a standard or norm for each phase of acquisition for major systems because the great differences in design complexity, production facilities, and manufacturing processes between missiles, tanks, aircraft, torpedoes, satellites, electronic jammers, and ships.

Question 13: In Deputy Secretary Carlucci's memorandum of April 30, 1981, regarding changes needed in defense acquisition, recommendation number 4 cited 18% as the estimated change component of cost growth for the 47 major programs covered by the December 31, 1980 Selected Acquisition Report. We understand that the 18% represents changes in estimated costs from Milestone II of the acquisition process. With regard to the 18% figure, please provide responses to the following:

a. For fiscal year 1981, how much of the estimating error cost growth was borne by DoD (in current dollars)? How much was borne by contractors? Please specify approximate costs to both, and provide a breakdown showing the government/contractor estimating cost growth for the five weapons systems in which the greatest cost growth occurred (if any or all of the five are classified, please provide this breakdown for estimating cost growth for the five highest growth unclassified weapons systems). Please note that the estimating change figures should not contain figures representing inflationary growth.

b. In how many of the weapons systems was the acquisition in the production stage? In how many was the acquisition in the full-scale development stage (of the 47 major systems covered by the SAR)?

c. For all unclassified weapons systems of the 47 covered by the SAR, please provide an approximate cost breakdown of the reasons for estimating change, i.e., how much was attributable to unforeseen wage changes, etc.?

d. For all of the major weapons systems in the production stage, what types of contracts, with prime contractors, are being utilized (please specify Firm Fixed Price (subject to no price change whatsoever), Fixed Price with Economic Price Adjustment, Fixed Price Incentive Fee, Cost Plus Incentive Fee, etc.)? In what stage of production is each acquisition?

Answer: Attached at Tab D.

Question 14: In regard to Recommendation number 2 in Deputy Secretary Carlucci's April 30, 1981 memorandum, how many weapons systems have been targeted for application of the preplanned product improvement approach during FY 82? What is the estimated dollar savings for FY 82 that will result from the application of this approach?

Answer: The Military Departments are examining programs for potential P3I applications. Both new start and on-going system programs are being scrutinized. We expect a dozen or more candidate applications will surface in each Department. Most of the impact of the P3I initiative will be felt in the FY 84 Defense program although we would hope to see some changes in the Services' FY 83 budget submittals. This is not to say that there is not activity meeting the P3I criteria going on during the FY 82 program execution. In these instances, however, the systems were already constructed in such a manner and therefore, we would not attribute any savings to the P3I initiatives per se. As with other acquisition improvement initiatives, near term or up-front funding is frequently required to obtain cost avoidance downstream.

Question 15: Please respond to the following questions concerning competition:

a. Please provide the Committee with all citations to existing regulatory and statutory requirements concerning competition in defense procurement.

b. What DAR regulations serve to promote competition by prime contractors in the procurement of goods and services from subcontractors? Please provide the Committee with citations to the appropriate regulations or guidance documents.

Answer: a. The basic statutory requirement concerning competition is the Armed Services Procurement Act of 1947, Title 10, U.S.C., Chapter 137. Regulatory requirements concerning competition are found throughout the Defense Acquisition Regulation (DAR). Significant citations include the following:

DAR 1-300.1 - Methods of Procurement - Competition.

DAR 1-302.2 - Sources Outside the Government.

DAR 1-313 - Procurement of Parts.

DAR 1-326 - Component Breakout.

DAR 1-1001 - General Policy (publicizing procurement actions).

DAR 2-102 - Policy (formal advertising).

DAR 3-101 - General (competition in negotiation).

DAR 4-104 - Method of Contracting (competition for R&D).

b. The following DAR contract provisions promote subcontract competition:

DAR 7-104.23 - Subcontracts.

DAR 7-104.41 - Competition in Subcontracting.

DAR Section XXIII, Part 1, provides for review of contractor's purchasing systems.

Question 16: Two areas of DoD contracting of particular interest to the Committee are follow-on after price competition and follow-on after design or technical competition.

a. How do you determine that it is appropriate to continue awarding contracts to an encumbent vendor after an initial price competition for a particular product? Does that determination take into account that other vendors may be able to provide the product at a lower price? Does the follow-on after price competition method of contracting satisfy statutory requirements for formal advertising?

Answer: For example, the F-14 aircraft is a follow-on after price competition. It is not practicable to compete the annual requirements, as no other supplier would have the know-how, tooling, facilities, etc., to compete for the requirement. If competition were feasible, the requirement would be competed. Negotiation with one source must be justified. Negotiation may be required, for example, because of standardization, urgency, industrial preparedness, or manufacture of the supplies requires substantial initial investment or extended period of preparation for manufacture. Negotiation is authorized by the Armed Services Procurement Act of 1947, 10 U.S.C., Chapter 137, where formal advertising cannot be used.

b. Similarly, how do you determine it is appropriate to award sole source follow-on contracts for production to a contractor who has won an earlier design or technical competition for a major system, when it is possible that other contractors could produce the system at a lower cost?

Answer: If it is feasible and practical, competition should be obtained in the production of a major system. However, a contractor who has won a development competition has know-how, tooling, facilities, and investment in the program. Another contractor would have to duplicate this effort in order to compete. Generally, the cost of duplicating this effort is prohibitive.

c. What are the potential disadvantages or negative consequences to the government of seeking competition on subsequent contracts after initial price competition and of seeking competitive bids on production contracts?

Answer: As previously mentioned, the F-14 contracts are follow-on after price competition. The current source has the know-how and substantial investment in the program. Another source would have to duplicate this effort in order to compete. Production delays and quality problems could be expected with award to an untried source. Where it is feasible to compete the procurement, it should be competed.

Question 17: The Carlucci memoranda of April 30, 1981 and July 27, 1981 contain thirty-two initiatives designed to improve and increase the effectiveness of the acquisition process. Several of them, for example, the initiative concerning enhanced competition in the acquisition process, have been viewed as important methods of saving substantial amounts of federal funds. While the Carlucci memorandum does contain many important ideas, there is less confidence than there should be that the policies in the memorandum can actually reduce costs and improve the weapons procurement process. This perception, especially on the part of the public, is in part due to the fact that there is no hard data on which to judge the potential effects of the Carlucci memorandum. Are there any estimates as to how much money, staff time or lead time (in various weapons procurements) will be saved through full implementation of the memorandum? If not, how did the Department decide which issues were important enough to include as part of the Deputy Secretary's memoranda? The Committee believes this matter is very important and would appreciate all efforts to respond to these questions.

Answer: We have no estimates on the potential savings that are possible with full implementation of the 30 April 1981 Carlucci memorandum on improving the acquisition process. Obviously, not all programs can implement each of the thirty-two initiatives. We are anticipating considerable return on investment for some of the initiatives (e.g., preplanned product improvement (P3I), multi-year procurement, economic production rates, increased competition, capital investment to enhance productivity, and program stability).

The Services are examining their major programs to ascertain which ones are good candidates for the aforementioned high payback approaches. For example, the Army has identified the BLACKHAWK Helicopter as a strong multi-year procurement candidate. The total production cost savings that are achievable through economic production rates are dramatic. For example, a change in the production rate of a high-performance jet fighter aircraft of 2-units per month can change the total cost over a five-year buy by approximately a billion dollars.

The Carlucci Initiatives were the result of a month-long study by senior DoD acquisition officials (both civilian and military) who made several hundred recommendations to Mr. Carlucci that would improve the DoD acquisition process. Mr. Carlucci chose those that appeared to have the greatest potential. Evaluation of this potential, however, was a matter of experienced judgement rather than a precise quantitative calculation. Persistent, intensive follow-up effort to make sure the initiatives really do take hold is essential.

Question 18: One of the most highly publicized instances of inadequate quality control has been in Electric Boat contracts on the Trident and SSN 688 submarines. Navy witnesses have testified that the problems have now been resolved. Please indicate the reasons for the initial difficulties as well as the corrective actions that have been taken.

Answer: The main reason for these serious problems at Electric Boat (EB) was that management placed more emphasis on cost and schedule than on quality and workmanship. Poor workmanship was found on installations and weldments. Wrong materials had been accepted by EB, made into parts and components and put into submarines. There was improper planning for weld production and control of weld quality. Approximately 6 ships were affected, all of which have now been corrected to the satisfaction of the Navy. EB management has made improvements in their manufacturing and quality system and are making changes in their management personnel. The long range effect of these actions are yet to be determined. The Navy has placed 50 more inspectors in the EB facility in Groton to provide additional assurance of contract conformance to the quality requirements.

Secretary of the Navy John Lehman has been personally involved in this problem and continues to watch this program carefully. He meets periodically with the President of General Dynamics (GD) to review GD's performance in all aspects of the program.

Answer to Question 6: The civilian total direct hire and indirect hire end strength for fiscal years 1960 through 1982 are as follows:

	Total *	Direct Hires* (In Thousands)	Indirect Hires
June 1960	1225.0	1047.1	177.9
1961	1212.6	1042.4	170.2
1962	1240.7	1069.5	171.1
1963	1213.4	1049.8	163.6
1964	1170.1	1029.8	140.3
1965	1164.2	1033.8	130.5
1966	1266.7	1138.1	128.5**
1967	1422.9	1302.6	120.3
1968	1436.0	1317.0	119.0
1969	1456.4	1341.6***	114.8
1970	1296.7****	1193.8	103.0
1971	1223.5	1127.2	96.2
1972	1192.6	1082.7	109.9
1973	1132.9	1031.0	101.9
1974	1164.5	1070.0	94.5
1975	1130.7	1041.8	88.9
June 1976	1096.3	1010.3	86.0
Sept 1977	1065.3	981.9	83.4
1978	1061.4	980.3	81.0
1979	1035.6	960.3	75.3
1980	1034.7	960.1	74.6
June 1981	1055.8	972.4	83.4
Pro- 1982 grammed	1056.0	968.0	88.0

* Includes civil and military functions

** Indirect hires of other Defense agencies included starting April 1966

*** Includes National Guard Technicians who become Federal employees on January 1, 1969

**** Youth Program employees are included in civilian direct hire data from 1964 to March 1970 and from January 1964 to present.

The program budget amendment and subsequent actions increased FY 81 civilian direct hires by 20,000 and indirect hires by 10,000 over levels programmed by the Carter Administration.

Historical data providing detail on civilian personnel with classifications in contract and procurement are available from June 1973 to present. The civilian occupations are:

GS-01102	Contract and Procurement
GS-01103	Industrial Property Management
GS-01105	Purchasing
GS-01106	Procurement Clerical and Assistance
GS-01150	Industrial Specialist

TAB A

The direct hire, full-time, general schedule employees for these classification groups for FY 73 to present are:

Civilian Occ.	Jun 73	Jun 74	Jun 75	Jun 76	Sep 77	Sep 78	Sep 79	Sep 80	Mar 81	Jun 81
GS-01102	11956	12298	12344	12361	12229	12765	13623	14044	14601	15002
GS-01103	842	864	843	807	754	753	766	748	772	795
GS-01105	2382	2480	2479	2472	2396	2437	2510	2677	2675	2736
GS-01106	4539	5121	5450	5439	5637	5897	6213	6498	6626	6958
GS-01150	3365	3440	3154	2575	2368	2354	2307	2277	2403	2581
TOTAL	23084	24203	24270	23654	23384	24206	25319	26244	27077	28072

These occupations represented between 2 and 3 percent of the total paid civilian end strengths.

Uniformed personnel in DoD-wide career development programs defined as contract and procurement occupations include:

Officers	
8D	Procurement and production
8A	General Logistics
8B	Supply
Enlisted	
551	Supply Administration

The number of active duty personnel with these career development fields declined since 1973 as follows:

Military Occ.	Jun 73	Jun 74	Jun 75	Jun 76	Sep 77	Sep 78	Sep 79	Sep 80	Mar 81	Jun 81
8D	2372	2375	2285	2001	1979	1940	1939	1913	1951	--
8A	4263	4040	3873	1933	1761	1880	1960	2019	2049	--
8B	7969	7544	7120	8875	8921	8941	6437	6336	6201	--
551	75927	60860	60642	62185	60988	61870	62832	63463	66243	--

The definition used for procurement personnel on the civilian side doesn't preclude the fact that other occupations may have personnel doing procurement functions and vice versa. These occupations are the most specific definition available. The Federal Acquisition Institute has a much broader definition of procurement personnel that includes everyone involved in acquisition, supply, management, transportation, et cetera.

No precise definition exists on the military side and the vast number of service specific occupations seemingly related to procurement functions make any definitions somewhat arbitrary. 8D is obviously procurement, the others are related.

Identical letter sent to:

Honorable George S. Bush
President of the Senate
Washington, D.C. 20510

(Military Personnel Policy)

APR 23 1981

Honorable Thomas P. O'Neill
Speaker of the House of Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

In accordance with the provisions of Section 410(d) of Public Law 91-121 (83 Stat. 212) there is enclosed a listing of persons who have filed the reports for FY 1980 required by section 410(b) of that law.

The enclosed summaries list the defense contractors alphabetically, and reflect the Military Departments and Defense Agency within the alphabetical arrangement. The reporting categories A, B, C, and D referred to in those listings are:

A. Retired military officer - Maj/Lt Cmdr or above,

B. Former military officer - Maj/Lt Cmdr or above;

C. Former civilian employee whose salary was equal to or above the minimum GS-13, salary level;

D. Former employee of or consultant to defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

Copies of the individual reports submitted by the present or former officers or employees are also enclosed, grouped according to the Department or Agency with which affiliated, and arranged alphabetically by last name of the officer or employee.

In accordance with section 410(f) of Public Law 91-121, a copy of these listings and reports will be available for public inspection in the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics).

Sincerely,

Signed

R. Dean Tice
Major General, USA
Deputy Assistant Secretary

BEST COPY AVAILABLE

CONSOLIDATED
FY 1980
Summary of Report Submitted Under Section 410 Public Law 91-121
Number of Reports by Category Submitted by Departments & Agencies*

	A	B	C	D	TOTAL
AIR FORCE	680	9	49	14	752
ARMY	322	16	29	9	376
NAVY	3	1	18	14	36
MARINE CORPS	26	0	0	0	26
OSD/JCS	0	3	34	9	46
DEFENSE COMMUNICATIONS AGENCY	0	0	12	10	22
DEFENSE CONTRACT AUDIT AGENCY	0	0	4	0	4
DEFENSE INTELLIGENCE AGENCY	1	0	0	0	1
DEFENSE MAPPING AGENCY	1	0	0	2	3
TOTALS	1033	29	146	58	1266

*A - Retired military officer - Maj/LtCmdr or above;

B - Former military officer - Maj/LtCmdr or above;

C - Former civilian employee whose salary was equal to or above minimum GS-13 during three years preceeding termination of service with DoD;

D - Former employee of, or consultant to, defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

CONSOLIDATED

FY 1980

Statistical Summary of Reports Received by OSD Pursuant to Section 410, Public Law 91-121

CORPORATION	Reports Received by Category*				
	A	B	C	D	TOTAL
1. AAI Corp.	3	0	1	1	5
2. A C S Construction Co.	0	0	0	0	0
3. AM General Corp.	0	0	0	0	0
4. A S E Texas, Inc.	0	0	0	0	0
5. ATO, Inc.	0	0	0	0	0
6. Abbott Products, Inc.	0	0	0	0	0
7. Adobe Regining Co.	0	0	0	0	0
8. Advanced Technology, Inc.	9	0	1	0	10
9. Aero Corp.	0	0	0	0	0
10. Aerojec General Corp.	0	0	0	0	0
11. Aerospace Corp.	5	0	8	0	13
12. Airesearch Mfg Co. of Arizona	0	0	1	0	1
13. Airesearch Mfg Co. of California	0	0	0	0	0
14. Airlift International, Inc	0	0	0	0	0
15. Alascom, Inc.	0	0	0	0	0
16. Altama Delta Corp.	0	0	0	0	0
17. American Airlines, Inc.	0	0	0	0	0
18. American Development Corp.	0	0	0	0	0
19. American Electronic Lab., Inc.	2	0	0	0	2
20. American Home Products Corp.	0	0	0	0	0
21. American President Lines, Ltd.	0	0	0	0	0
22. American Telephone & Telegraph Co.	0	0	0	0	0
23. American Trading Production	0	0	0	0	0
24. Amex Systems, Inc.	1	0	0	0	1
25. Amoco Oil Co.	0	0	0	0	0
26. Amron Corp.	0	0	0	0	0
27. Analysis & Technology, Inc.	0	0	0	0	0
28. Analytic Sciences Corp.	3	0	2	0	5
29. Arco Petroleum Co.	0	0	0	0	0
30. Arinc Research Corp.	1	0	0	0	1
31. Aro, Inc.	0	0	0	0	0
32. Ashland Oil, Inc.	0	0	0	0	0
33. Ashland Petroleum Co.	0	0	0	0	0
34. Atlantic Research Corp.	0	0	1	0	1
35. Atlantic Richfield Co.	0	0	0	0	0
36. Atlas Processing Co.	0	0	0	0	0
37. Automation Industries, Inc.	3	0	2	0	5
38. Avco Corp.	5	0	1	0	6
39. Avco Everett Research Lab.	0	0	0	1	1
40. Avondale Shipyards, Inc.	0	0	0	0	0
41. Aydin Corp.	0	0	0	0	0
42. Ayer NW ABH International, Inc.	0	0	0	0	0
43. BDM Corp.	50	2	2	2	56
44. BDM Services Co.	2	0	0	0	2
45. Baltimore Gas & Electric Co.	0	0	0	0	0
46. Bates Ted & Co., Inc.	0	0	0	0	0
47. Bath Iron Works Corp.	1	0	0	0	1

CORPORATION		Reports Received by Category*				
		A	B	C	D	TOTAL
48.	Battelle Memorial Institute	4	1	0	0	5
49.	Bauer Max Meat Packer	0	0	0	0	0
50.	Beech Aerospace Services, Inc.	0	0	0	0	0
51.	Beech Aircraft Corp.	0	0	0	0	0
52.	Belcher Oil Co.	0	0	0	0	0
53.	Bell & Howell Co.	0	0	0	0	0
54.	Bendix Corp.	3	0	1	0	4
55.	Bendix Field Engineering Corp.	0	0	0	0	0
56.	Bethlehem Steel Co.	0	0	0	0	0
57.	Blaw Knox Foundry & Mil Machinery	0	0	0	0	0
58.	Boeing Aerospace Co.	54	3	0	0	57
59.	Boeing Co.	71	4	12	0	87
60.	Boeing Services International	3	0	1	0	4
61.	Boeing Vertol Co.	1	0	0	0	1
62.	Bolt Beranek & Newman, Inc.	3	0	2	0	5
63.	Booz, Allen & Hamilton, Inc.	3	0	2	0	5
64.	Brantley Construction Co., Inc.	0	0	0	0	0
65.	Braswell Shipyards, Inc.	0	0	0	0	0
66.	Brooks & Perkins, Inc.	0	0	0	0	0
67.	Brunswick Corp.	3	0	0	0	3
68.	Bulova Watch Co., Inc.	0	0	0	0	0
69.	Bunker Ramo Corp.	3	0	0	0	3
70.	Burroughs Corp.	0	0	1	0	1
71.	CDI Corp.	0	0	0	0	0
72.	C Three Inc.	0	0	0	0	0
73.	California, University of	0	0	0	0	0
74.	Calspan Corp.	6	0	1	0	7
75.	Caltex Oil Products Co.	0	0	0	0	0
76.	Campbell Soup Co.	0	0	0	0	0
77.	Carnation Co.	0	0	0	0	0
78.	Carolina Power & Light Co.	0	0	0	0	0
79.	Central Gulf Lines, Inc.	0	0	0	0	0
80.	Centre Mfg Co., Inc.	0	0	0	0	0
81.	Chamberlain Mfg. Co.	1	1	0	0	2
82.	Chandler Evans Corp.	0	0	0	0	0
83.	Charles Stark Draper Lab, Inc.	0	0	0	0	0
84.	Chesapeake & Potomac Telephone	0	0	0	0	0
85.	Chevron USA Inc.	0	0	0	0	0
86.	Chromalloy American Corp.	0	0	0	0	0
87.	Chromalloy American Corp.	0	0	0	0	0
88.	Chrysler Corp.	4	0	0	0	4
89.	Chrysler Defense, Inc.	2	0	0	0	2
90.	Cincinnati Electronics Corp.	0	0	0	0	0
91.	Cities Service Oil Co.	0	0	0	0	0
92.	Coastal Drydock Repair	0	0	0	0	0
93.	Coastal States Marketing, Inc.	0	0	0	0	0
94.	Coloney, Wayne H., Co., Inc.	1	0	0	0	1
95.	Colt Industries, Inc.	0	0	0	0	0
96.	Colt Industries Operating Corp.	0	0	0	0	0
97.	Comarco, Inc.	0	0	0	0	0
98.	Command Control & Communications	2	0	0	0	2
99.	Communications Satellite Corp.	0	0	0	0	0
100.	Computer Sciences Corp.	34	0	10	2	46

Reports Received by Category*

CORPORATION	A	B	C	D	TOTAL
101. Comtech Telecommunications Corp.	0	0	0	0	0
102. Condec Corp.	0	0	0	0	0
103. Control Data Corp.	2	0	0	0	2
104. Cubic Corp.	0	0	0	0	0
105. Curtiss Wright Corp.	0	0	0	0	0
106. Cutler Hammer, Inc.	0	0	0	0	0
107. DM&S, Inc.	0	0	0	0	0
108. Data Design Labs.	4	0	0	1	5
109. Day & Zimmerman, Inc.	2	0	0	0	2
110. Dayton, University of	2	0	1	0	3
111. Delta Refining Co.	0	0	0	0	0
112. Detroit Diesel Engine Corp.	0	0	0	0	0
113. Diagnostic Retrieval Systems, Inc.	0	0	0	0	0
114. Dickman Const. Co.	0	0	0	0	0
115. Doss Aviation, Inc.	1	0	0	0	1
116. Douglas Oil Co. of California	0	0	0	0	0
117. Deebuque Packing Co.	0	0	0	0	0
118. Dynalectron Corp.	2	0	0	0	2
119. Dynamics Research Corp.	1	0	0	0	1
120. EG&G, Inc.	1	0	0	0	1
121. ESL, Inc.	2	0	0	0	2
122. E Systems, Inc.	14	0	0	0	14
123. East Wind Industries, Inc.	0	0	0	0	0
124. Eastman Kodak Co.	0	0	0	0	0
125. Eaton Corp.	0	0	1	2	3
126. Edgington Oil Co.	0	0	0	0	0
127. EDO Corp.	0	0	0	0	0
128. Electrospace Systems, Inc.	1	0	0	0	1
129. Emerson Electric Co.	6	0	0	0	6
130. Energy Specialists, Inc.	0	0	0	0	0
131. Engineering Research, Inc.	0	0	0	0	0
132. Exxon Corp.	1	0	0	0	1
133. F K C Engineering Corp.	0	0	0	0	0
134. FMC Corp.	4	0	1	0	5
135. F N Mfg., Inc.	0	0	0	0	0
136. Fairchild Camera & Instrument	0	0	0	0	0
137. Fairchild Industries, Inc.	6	0	0	0	6
138. Farrell Lines, Inc.	0	0	0	0	0
139. Federal Electric Corp.	1	0	0	0	1
140. Flanigan James J. Shipping Corp.	0	0	0	0	0
141. Florida Power & Light Co.	0	0	0	0	0
142. Flying Tiger Line, Inc.	0	0	1	0	1
143. Ford Aerospace & Communications	4	0	1	0	5
144. Fugro National, Inc.	0	0	0	0	0
145. Fuller Oil Co.	0	0	0	0	0
146. GTE Sylvania, Inc.	7	0	2	1	10
147. Garrett Corp.	0	0	0	0	0
148. General Defense Corp.	0	0	0	0	0
149. General Dynamics Corp.	20	1	11	0	32
150. General Electric Co.	12	1	1	0	14
151. General Foods Corp.	0	0	0	0	0
152. General Mills Inc.	0	0	0	0	0
153. General Motors Corp.	7	3	0	0	10
154. General Research Corp.	14	0	1	0	15
155. Georgia Technical Research Inst.	0	0	0	0	0
156. Getty Oil Co.	0	0	0	0	0

CORPORATION	Reports Received by Category*				
	A	B	C	D	TOTAL
157. Getty Refining & Marketing Co.	0	0	0	0	0
158. Gibbs & Cox, Inc.	0	0	0	0	0
159. Gibralter Fabrics, Inc.	0	0	0	0	0
160. Gladieux Refinery, Inc.	0	0	0	0	0
161. Glenn Berry Mfg. Inc.	0	0	0	0	0
162. Global Associates	0	1	0	0	1
163. Golden Eagle Refining Co., Inc.	0	0	0	0	0
164. Good Hope Refineries, Inc.	0	0	0	0	0
165. Goodrich, B. F., Co.	0	0	0	0	0
166. Goodyear Aerospace Corp.	2	0	0	2	4
167. Gould, Inc.	1	0	1	0	2
168. Grimes Oil Co., Inc.	0	0	0	0	0
169. Grumman Aerospace Corp.	3	0	0	2	5
170. Guam Oil & Refining Co., Inc.	0	0	0	0	0
171. Gulf Apparel Corp.	0	0	0	0	0
172. Gulf Oil Corp.	0	1	0	0	1
173. Gulf Power Co.	0	0	0	0	0
174. HRB Singer, Inc.	1	0	0	1	2
175. Hamilton Technology, Inc.	0	0	0	0	0
176. Harris Corp.	8	0	0	0	8
177. Harris Frederic R., Inc.	0	0	0	0	0
178. Harsco Corp.	0	0	0	0	0
179. Hawaiian Electric Co., Ltd.	0	0	0	0	0
180. Hawaiian Independent Refining Co	0	0	0	0	0
181. Hayes International Corp.	0	0	0	0	0
182. Hazeltine Corp.	1	0	0	0	1
183. Henningston Durham Richardson	0	0	0	0	0
184. Henrys Hickory House	0	0	0	0	0
185. Hercules, Inc.	6	0	0	1	7
186. Hess Oil Virgin Island Corp.	0	0	0	0	0
187. Hewlett Packard Co.	1	0	0	0	1
188. Honeywell, Inc.	10	0	2	3	15
189. Honeywell Information Systems	2	0	0	0	2
190. Hughes Aircraft Co.	46	1	6	3	56
191. Hunt Bldg. Corp.	0	0	0	0	0
192. ICI United States, Inc.	0	0	0	0	0
193. ITT Arctic Svcs, Inc.	0	0	0	0	0
194. ITT Gilfillan, Inc.	0	0	1	1	2
195. Illinois Institute of Technology	5	1	1	0	7
196. Ingersoll-Rand Co.	0	0	0	0	0
197. Institute for Defense Analysis	2	0	0	0	2
198. International Manufacturing Co.	0	0	0	0	0
199. Internation Business Machines Co.	5	0	0	3	8
200. International Telephone & Telegraph	2	0	0	0	2
201. Interstate Electronics Corp.	0	0	1	0	1
202. Itek Corp.	0	0	0	0	0
203. Jackson Oil Co.	0	0	0	0	0
204. Jacksonville Shipyards, Inc.	0	0	1	0	1
205. Jaycor	12	0	1	0	13
206. Jersey Central Power & Light Co.	0	0	0	0	0
207. Jets Svcs., Inc.	0	0	0	0	0
208. Johns Hopkins Univ.	0	0	0	3	3
209. Kaiser Aerospace & Electronics	1	0	0	0	1
210. Kaman Aerospace Corp.	1	0	0	1	2

Reports Received by Category*

CORPORATION		A	B	C	D	TOTAL
262.	Norris Industries, Inc.	0	0	0	0	0
263.	North Pole Refining Co.	0	0	0	0	0
264.	Northrop Corp.	25	0	3	1	29
265.	Northrop Worldwide Aircraft Svc	16	0	0	0	16
266.	Northwest Airlines, Inc.	0	0	0	0	0
267.	Norton Co.	0	0	0	0	0
268.	O K C Trading Co.	0	0	0	0	0
269.	O R I, Inc.	1	0	0	0	1
270.	Ocean Technology, Inc.	0	0	0	0	0
271.	Olin Corp.	0	0	0	0	0
272.	Oshkosh Truck Corp.	1	0	0	0	1
273.	P&B Services, Inc.	0	0	0	0	0
274.	Paccar, Inc.	0	0	0	0	0
275.	Pacific Northern Oil Corp.	0	0	0	0	0
276.	Page Airways, Inc.	0	0	0	0	0
277.	Pan American World Airways, Inc.	2	0	0	0	2
278.	Papa Mario & Sons, Inc.	0	0	0	0	0
279.	Parker Hannifin Corp.	0	0	0	0	0
280.	Parsons Ralph M., Co, Inc.	4	0	2	0	6
281.	Pennsylvania State Univ.	0	0	0	0	0
282.	Perkin Elmer Corp.	1	0	0	0	1
283.	Philip Morris, Inc.	0	0	0	0	0
284.	Phillips Petroleum Co.	0	0	0	1	1
285.	Pioneer Refining Co.	0	0	0	0	0
286.	Planning Research Corp.	10	0	0	1	11
287.	Pneumo Corp.	0	0	0	0	0
288.	Powerine Oil Co.	0	0	0	0	0
289.	Pride Refining, Inc.	0	0	0	0	0
290.	Proctor & Gamble Distributing Co.	0	0	0	0	0
291.	QED Systems, Inc.	0	0	0	0	0
292.	R&D Associates	2	0	1	1	4
293.	RCA Corp.	6	0	2	1	9
294.	RCA Global Communications, Inc.	0	0	0	0	0
295.	Rand Corp.	2	0	0	0	2
296.	Raytheon Co.	19	0	1	2	22
297.	Raytheon Svc. Co.	2	0	1	0	3
298.	Reelfoot Packing Co.	0	0	0	0	0
299.	Remington Arms Co.	0	0	0	0	0
300.	Reynolds R. J. Industries, Inc.	0	0	0	0	0
301.	Riedel International, Inc.	0	0	0	0	0
302.	Rochester, Univ. of	0	0	1	1	2
303.	Rockwell Int'l Corp.	22	0	1	1	24
304.	Rohr Industries, Inc.	0	0	0	2	2
305.	Rosenblatt M Son, Inc.	0	0	0	0	0
306.	SRI International	6	0	3	0	9
307.	San Francisco Welding & Steel	0	0	0	0	0
308.	Sanders Assoc., Inc.	6	0	0	0	6
309.	Santa Barbara Research Ctr.	0	0	0	0	0
310.	Sargent Fletcher Co.	0	0	0	0	0
311.	Saxon B B Co., Inc.	0	0	0	0	0
312.	Science Applications, Inc.	22	1	4	0	27
313.	Sea Land Service, Inc.	1	0	0	0	1

Reports Received by Category*

CORPORATION		A	B	C	B	TOTAL
211.	Kaman Sciences Corp.	0	0	0	0	0
212.	Kenco Refining, Inc.	0	0	0	0	0
213.	Kentron Hawaii, Ltd	0	0	0	0	0
214.	Kings Point Mfg. Co.	0	0	0	0	0
215.	Killmorgen Corp.	0	0	0	0	0
216.	Kraft Co.	0	0	0	0	0
217.	Lancer Clothing Corp.	0	0	0	0	0
218.	Landmark Beef Processors, Inc.	0	0	0	0	0
219.	Lanson Industries, Inc.	0	0	0	0	0
220.	Lear Siegler, Inc.	5	0	0	0	5
221.	Libby Welding Co.	0	0	0	0	0
222.	Linkabit Corp.	0	0	0	0	0
223.	Litton Industries, Inc.	1	0	0	0	1
224.	Litton Systems, Inc.	8	0	0	2	10
225.	Lockheed Corp.	18	0	2	0	20
226.	Lockheed Electronics Co., Inc.	0	0	0	1	1
227.	Lockheed Missiles & Space Co	34	0	0	0	34
228.	Lockheed Shipbuilding Const.	0	0	0	0	0
229.	Loggins Meat Co.	0	0	0	0	0
230.	Logicon, Inc.	6	0	0	0	6
231.	Loral Corp.	1	0	0	0	1
232.	Lykes Bros. Steamship Co., Inc.	0	0	0	0	0
233.	M B Associates	0	0	0	0	0
234.	Magnavox Co.	0	0	0	0	0
235.	Magnavox Gov't & Industrial Elec.	1	0	0	0	1
236.	Man Tech Corp.	2	0	0	1	3
237.	Mgmt & Technical Svcs Co.	1	0	1	0	2
238.	Marinette Marine Corp.	0	0	0	0	0
239.	Marion Corp.	0	0	0	0	0
240.	Marquardt Co.	0	0	0	0	0
241.	Martin Marietta Aluminum Sales	0	0	0	0	0
242.	Mason & Hanger Silas Mason Co.	1	0	0	0	1
243.	Mason Chamberlain, Inc.	0	0	0	0	0
244.	Massachusetts Inst. of Tech.	2	0	0	1	3
245.	Mayer Oscar & Co., Inc.	0	0	0	0	0
246.	McDonnell Douglas Corp.	25	1	1	2	29
247.	Merck & Co., Inc.	0	0	0	0	0
248.	Midland Ross Corp.	2	0	0	0	2
249.	Mine Safety Appliances Co.	0	0	0	0	0
250.	Minnesota Mining & Mfg Co.	0	0	0	0	0
251.	Mitre Corp.	2	0	2	2	6
252.	Mobil Oil Corp.	3	0	0	0	3
253.	Morrell John & Co.	0	0	0	0	0
254.	Motorola, Inc.	4	0	0	0	4
255.	National Steel & Shpbldg Co.	0	0	0	0	0
256.	Navajo Refining Co.	0	0	0	0	0
257.	Nestle Co., Inc.	0	0	0	0	0
258.	New Mexico State Univ.	0	0	0	0	0
259.	Newport News Shpbldg & Drydock Co.	0	0	0	0	0
260.	Norden Systems Inc.	3	0	0	0	3
261.	Norfolk Dredging Co.	0	0	0	0	0

	Reports Received by Category*				
CORPORATION	A	B	C	D	TOTAL
314. Selma Apparel Corp.	0	0	0	0	0
315. Shell Oil Co.	0	0	0	0	0
316. Simmons Precision Products	0	0	0	0	0
317. Simplex Wire & Cable Co.	0	0	0	0	0
318. Singer Co.	2	0	1	2	5
319. Sippican Corp.	0	0	0	0	0
320. Smith L H Oil Corp.	0	0	0	0	0
321. Softech, Inc.	0	0	0	0	0
322. Solar Turbines International	0	0	0	0	0
323. Southern California Edison Co.	0	0	0	0	0
324. Southern California, Univ of	0	0	0	0	0
325. Southern Packaging & Storage Co.	0	0	0	0	0
326. Southern Union Refining Co.	1	0	0	0	1
327. Southwest Marine, Inc.	0	0	0	0	0
328. Southwest Research Institute	3	0	2	0	5
329. Southwest Truck Body	0	0	0	0	0
330. Southwestern Refining Co., Inc.	0	0	0	0	0
331. Sparton Corp.	0	0	0	0	0
332. Spears Assoc., Inc.	0	0	0	0	0
333. Sperry Corp.	16	1	1	1	19
334. Standard Mfg. Co.	0	0	0	0	0
335. Stanford, Univ of	1	0	0	1	2
336. Steinberg Bros., Inc.	0	0	0	0	0
337. Stewart Petroleum Co.	0	0	0	0	0
338. Stewart Warner Corp.	0	0	0	0	0
339. Summa Corp.	0	0	0	0	0
340. Sun Chemical Corp.	0	0	0	0	0
341. Sun Co., Inc.	0	0	0	0	0
342. Sun Shipbldg Drydock Co.	1	0	0	0	1
343. Sundstrand Corp.	2	0	0	0	2
344. Superior Welding, Inc.	0	0	0	0	0
345. Supreme Beef Co., Inc.	0	0	0	0	0
346. Swift & Co.	0	0	0	0	0
347. System Development Corp.	9	0	1	0	10
348. System Planning Corp.	16	0	6	1	23
349. Systems Consultants, Inc.	3	0	2	0	5
350. Systems Research Labs, Inc.	4	0	1	0	5
351. TRW Colorado Electronics Inc.	0	0	0	0	0
352. TRW Inc.	28	0	6	2	36
353. Taylor T H Inc.	0	0	0	0	0
354. Technology Development Corp.	0	0	0	0	0
355. Technology Svc. Corp.	0	0	0	0	0
356. Tektronix, Inc.	2	0	1	0	3
357. Teledyne Brown Engineering	5	0	5	0	10
358. Teledyne CAE	0	0	0	0	0
359. Teledyne Electronics	1	0	0	0	1
360. Teledyne, Inc.	2	0	0	0	2
361. Teledyne MEC	0	0	0	0	0
362. Teledyne Corp.	0	0	0	0	0
363. Tennessee Apparel Corp.	0	0	0	0	0
364. Tesoro Alaskan Petroleum Corp.	0	0	0	0	0

Reports Received by Category*

CORPORATION	A	B	C	B	TOTAL
365. Texas Instruments, Inc.	11	1	2	0	14
366. Texas, Univ of	0	0	0	0	0
367. Textron, Inc.	11	0	1	0	12
368. Thiokol Corp.	3	0	1	0	4
369. Thompson J. Walter Co.	0	0	0	0	0
370. Tierney Mfg. Co.	0	0	0	0	0
371. Tiger Int'l Inc.	0	0	0	0	0
372. Todd Shipyards Corp.	1	0	0	0	1
373. Tonkawa Refining Co.	0	0	0	0	0
374. Total Petroleum, Inc.	0	0	0	0	0
375. Tracor, Inc.	7	0	2	1	10
376. Trans Int'l Airlines, Inc.	0	0	0	0	0
377. Transamerica Airlines, Inc.	0	0	0	0	0
378. Transamerica Delaval, Inc.	0	0	0	0	0
379. Treadwell Corp.	0	0	0	0	0
380. Tri Par Combustion Corp.	0	0	0	0	0
381. Union Carbide Corp.	1	0	0	0	1
382. Union Oil Co. of California	0	0	0	0	0
383. Uniroyal, Inc.	0	0	0	0	0
384. United States Lines Co.	0	0	0	0	0
385. United Technologies Corp.	15	0	1	0	16
386. United Terminals, Inc.	0	0	0	0	0
387. VSE Corp.	7	0	0	0	7
388. Valmac Industries, Inc.	0	0	0	0	0
389. Vanguard Oil & Svc Co.	0	0	0	0	0
390. Varian Associates	0	0	0	0	0
391. Veda, Inc.	1	0	0	0	1
392. Virginia Electric & Power Co.	0	0	0	0	0
393. Vought Corp.	18	1	1	0	20
394. Wallace & Wallace Fuel Oil, Inc.	0	0	0	0	0
395. Washington, Univ. of	0	0	0	0	0
396. Watkins Johnson Co.	1	0	0	0	1
397. Western Electric Co., Inc.	1	0	1	0	2
398. Western Gear Corp.	0	0	0	0	0
*399. Western Union Telegraph Co.	2	0	1	0	3
400. Westinghouse Electric Corp.	13	0	1	0	14
401. Whittaker Corp.	1	0	0	0	1
402. Williams Research Corp.	1	0	1	0	2
403. Wilson & Co., Inc.	0	0	0	0	0
404. Woodson A P Co.	0	0	0	0	0
405. World Airways, Inc.	0	0	0	0	0
406. Wylie Corp., The	0	0	0	0	0
407. Wyoming Refining Co.	0	0	0	0	0
408. Xerox Electro Optical Systems	0	0	0	0	0
409. Zantep Int'l Airlines, Inc.	0	0	0	0	0
410. Zapata Marine Services, Inc.	0	0	0	0	0
*411. Western Union Int'l, Inc.	0	0	0	0	0
TOTALS	1033	29	146	58	1266

APR 2 8 1980

(Military Personnel Policy)

Honorable Walter F. Mondale
President of the Senate
Washington, D. C. 20510

Identical ltr sent to:
Honorable Thomas P. O'Neill
Speaker of the House of
Representatives
Washington, D. C. 20515

Dear Mr. President:

In accordance with the provisions of Section 410(d) of Public Law 91-121 (83 Stat. 212) there is enclosed a listing of persons who have filed the reports for FY [illegible] required by section 410(b) of that law.

The enclosed summaries list the defense contractors alphabetically, and reflect the Military Department and Defense Agency within that alphabetical arrangement. The reporting categories A, B, C, and D referred to in those listings are:

A. Retired military officer - Maj/Lt Cmdr or above;

B. Former military officer - Maj/Lt Cmdr or above;

C. Former civilian employee whose salary was equal to or above the minimum GS-13, salary level;

D. Former employee of or consultant to defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

Copies of the individual reports submitted by the present or former officers or employees are also enclosed, grouped according to the Department or Agency with which affiliated, and arranged alphabetically by last name of the officer or employee.

In accordance with section 410(f) of Public Law 91-121, a copy of these listings and reports will be available for public inspection in the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics).

cerely,

[illegible]

Dean Tice
jor General, USA
puty Assistant Secretary

TAB B-2

BEST COPY AVAILABLE

CONSOLIDATED

Summary of Report Submitted Under Section 410 Public Law 91-121

FY 1979

Number of Reports by Category Submitted by Departments & Agencies*

	A	B	C	D	TOTAL
AIR FORCE	1119	10	44	8	1181
ARMY	301	18	39	28	386
NAVY/MARINE CORPS	16	1	28	14	59
OSD/JCS	11	4	18	13	46
DEFENSE INTELLIGENCE AGENCY	1	0	2	5	8
DEFENSE LOGISTICS AGENCY	1	0	0	0	1
NATIONAL SECURITY AGENCY	1	0	0	0	1
DEFENSE MAPPING AGENCY	0	0	0	2	2
NAVAL RESEARCH LAB	0	0	1	1	2
DEFENSE CONTRACT AUDIT AGENCY	0	0	2	0	2
DEFENSE COMMUNICATIONS AGENCY	0	0	6	8	14
TOTALS	1450	33	140	79	1702

*A - Retired military officer - Maj/Lt Cmdr or above;

B - Former military officer - Maj/Lt Cmdr or above;

C - Former civilian employee whose salary was equal to or above minimum GS-13 during three years preceeding termination of service with DoD;

D - Former employee of, or consultant to, defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

CONSOLIDATED FY 1979

Statistical Summary of Reports Received by OSD Pursuant to Section 410,
Public Law 91-121

	CORPORATION	Reports Received by Category*				
		A	B	C	D	TOTAL
1.	AAI Corp.	1	0	2	2	5
2.	A J Industries, Inc.	0	0	0	0	0
3.	A M General Corporation	0	0	0	0	0
4.	Action Mfg. Co.	0	0	0	0	0
5.	Adobe Refining Co.	0	0	0	0	0
6.	Advanced Technology, Inc.	1	0	0	0	1
7.	Aerojet-General Corp.	6	0	1	0	7
8.	Aerospace Corp. (The)	4	0	3	1	8
9.	Airlift International Inc.	0	0	0	0	0
10.	Aleutian Corp.	0	0	0	0	0
11.	Algernon Blair, Inc.	0	0	0	0	0
12.	Altama Delta Corp.	0	0	0	0	0
13.	American Development Corp.	0	0	0	0	0
14.	American Electronic Labs Inc.	1	0	0	0	1
15.	American Home Products Corp.	0	0	0	0	0
16.	American Telephone & Telegraph Co.	1	0	0	0	1
17.	Amex Systems, Inc.	1	0	0	0	1
18.	Amoco Oil Co.	0	0	0	0	0
19.	Amron Corp.	0	0	0	0	0
20.	Analytical Services, Inc.	4	0	1	0	5
21.	Argosystems, Inc.	2	0	0	0	2
22.	Arinc Research Corp.	11	1	0	0	12
23.	ARO, Inc. (Subs. Sverdup Corp)	0	0	0	0	0
24.	Ashland Oil Inc.	0	0	0	0	0
25.	Atlantic Richfield Co.	1	0	0	0	1
26.	Atlas Processing Co.	0	0	0	0	0
27.	Automation Industries, Inc.	2	0	2	0	4
28.	AVCO Corp.	9	0	2	1	12
29.	AVCO Everett Research Lab., Inc.	0	0	0	1	1
30.	Avondale Shipyards, Inc.	0	0	0	0	0
31.	N. W. Ayer & Son, Inc.	0	0	0	0	0
32.	BDM Corp.	86	2	6	2	96
*33.	Baltimore Gas & Electric	0	0	0	0	0
34.	Bates Ted & Co., Inc.	0	0	0	0	0
35.	Bath Iron Works Corp.	1	0	0	0	1
36.	Battelle Memorial Institute	6	0	1	0	7
37.	Bauer Max Meat Packer	0	0	0	0	0
38.	Beech Aircraft Corp.	7	0	0	0	7
39.	Bendix Corp.	6	0	1	1	8
40.	Bendix Field Engineering Corp.	1	1	0	0	2
41.	Boeing Aerospace Co.	73	4	1	0	78
42.	Boeing Co.	53	6	5	0	64
43.	Boeing Vertol Co.	0	0	0	0	0
44.	Bolt Beranek & Newman, Inc.	0	0	0	0	0
45.	Booz, Allen & Hamilton, Inc.	5	0	1	0	6
46.	Borg-Warner Corp.	0	0	0	0	0
47.	Brooks & Perkins, Inc.	0	0	0	0	0
* 32a.	BDM Services Co.	1	0	0	0	1

		Reports Received by Category*				
	CORPORATION	A	B	C	D	TOTAL
48.	Brunswick Corp.	2	1	1	0	4
49.	Bulova Watch Co., Inc.	0	0	0	0	0
50.	Bunker Ramo Corp.	5	0	1	0	6
51.	Burroughs Corp.	4	0	0	1	5
52.	CDI Corp.	0	0	0	0	0
53.	California, Univ. of	2	0	0	0	2
54.	Calspan Corp.	12	0	2	0	14
55.	Caltex Oil Products Co.	0	0	0	0	0
56.	Campbell Soup Co.	0	0	0	0	0
57.	Carnation Co.	0	0	0	0	0
58.	Carolina Power & Light Co.	0	0	0	0	0
59.	Chamberlain Mfg Corp.	1	0	0	0	1
60.	Chandler Evans Inc.	0	0	0	0	0
61.	Charles Stark Draper Labs, Inc.	0	0	0	0	0
62.	Chesapeake & Potomac Telephone Co.	0	0	0	0	0
63.	Chevron U.S.A. Inc.	0	0	0	0	0
64.	Chromallow American Corp.	0	0	0	0	0
65.	Chrysler Corp.	6	0	0	2	8
66.	Cincinnati Electronics Corp.	0	0	0	0	0
67.	Coastal States Trading, Inc.	0	0	0	0	0
68.	Coastal Dry Dock Repair	0	0	0	0	0
69.	Coastal States Marketing, Inc.	0	0	0	0	0
70.	Coloney Wayne H., Inc.	1	0	0	0	1
71.	Colt Industries, Inc.	1	0	0	0	1
72.	Communications Satellite Corp.	0	0	0	0	0
73.	Computer Sciences Corp.	42	1	4	3	50
74.	Comtech Labs, Inc.	0	0	0	0	0
75.	Conoco Inc.	0	0	0	0	0
76.	Conrac Corp.	0	0	0	0	0
77.	Contravez-Goerz Corp. (Sub. Contraves A.G.)	0	0	0	0	0
78.	Control Data Corp.	4	0	3	0	7
79.	Cubic Corp.	4	0	0	0	4
80.	Curtiss-Wright Corp.	0	0	0	0	0
81.	Cutler-Hammer, Inc.	1	0	0	1	2
82.	Data Design Labs.	3	0	0	0	3
83.	Dataproducts Corp.	0	0	0	0	0
84.	Day & Zimmerman, Inc.	1	0	0	0	1
85.	Dayton, Univ. of	3	0	1	0	4
86.	Delta Refining Co.	0	0	0	0	0
87.	Douglas Oil Co. of Calif.	0	0	0	0	0
88.	Dynalectron Corp.	8	0	0	0	8
89.	Dynamics Research Corp.	3	0	0	0	3
90.	EG&G Inc.	8	0	1	0	9
91.	ESL Inc.	4	0	1	0	5
92.	E-Systems, Inc.	24	0	0	0	24
93.	Eastern Canvas Prod. Inc.	0	0	0	0	0
94.	Eastman Kodak Co.	1	0	0	0	1
95.	Edgington Oil Co.	0	0	0	0	0
96.	EDO Corp.	1	0	0	0	1
97.	Electrospace Systems, Inc.	0	0	0	0	0
98.	Emerson Electric Co.	10	0	0	0	10
99.	Energy Specialists, Inc.	0	0	0	0	0
100.	Engineering Research Inc.	0	0	0	0	0
101.	Ensign-Bickford Co. (Sub. E-B Ind. Inc.)	0	0	0	0	0

	Reports Received by Category*				
CORPORATION	A	B	C	D	TOTAL
102. Etowah Mfg Co., Inc.	0	0	0	0	0
103. Exxon Corp.	0	0	0	0	0
104. FMC Corp.	7	0	0	0	7
105. Fairchild Camera & Instrument Corp.	2	0	0	0	2
106. Fairchild Industries, Inc.	13	0	1	0	14
107. Federal Electric Corp.	1	0	0	0	1
108. Felec Services, Inc.	2	0	0	0	2
109. Ferrulmatic Inc.	0	0	0	0	0
110. Flanagan, James J. Shipping Corp.	0	0	0	0	0
111. Flinchbaugh Products, Inc.	0	0	0	0	0
112. Florida Power & Light Co.	0	0	0	0	0
113. Ford Aerospace & Communications	22	1	1	0	24
114. Fortec Constructors	0	0	0	0	0
115. GTE Sylvania Inc.	7	0	1	1	9
116. Garrett Corp.	0	0	0	0	0
117. General Dynamics Corp.	65	3	6	0	74
118. General Electric Co.	21	1	1	1	24
119. General Foods Corp.	0	0	0	0	0
120. General Motors Corp.	4	2	0	0	6
121. General Research Corp.	20	0	1	0	21
122. General Time Corp.	0	0	0	0	0
123. Getty Oil Co.	0	0	0	0	0
124. Gibbs & Cox, Inc.	0	0	0	0	0
125. Gladieux Refinery, Inc.	0	0	0	0	0
126. Global Associates	0	0	0	0	0
127. Golden Eagle Refining Co., Inc.	0	0	0	0	0
128. Goodrich, B. F., Co.	0	0	0	0	0
129. Goodyear Aerospace Corp.	5	0	0	0	5
130. Gould, Inc.	2	0	1	0	3
131. Grumman Aerospace Corp.	5	0	0	2	7
132. Guam Oil & Refining Co., Inc.	0	0	0	0	0
133. Gulf Oil Corp.	0	0	0	0	0
134. H & S Corp.	0	0	0	0	0
135. HRB Singer, Inc.	1	0	0	1	2
136. Haehn Construction Co.	0	0	0	0	0
137. Hamilton Technology, Inc.	0	0	0	0	0
138. Harris Corp.	11	0	1	0	12
139. Harsco Corp.	0	0	0	0	0
140. Hawaiian Independent Refinery, Inc.	0	0	0	0	0
141. Hayes International Corp.	0	0	0	0	0
142. Hazeltine Corp.	2	0	0	0	2
143. Heckethorn Mfg. Co.	0	0	0	0	0
144. Henry's Hickory House, Inc.	1	0	0	0	1
145. Hercules, Inc.	4	0	0	0	4
146. Hess Oil Virgin Island Corp.	0	0	0	0	0
147. Hewlett Packard Co.	2	0	0	0	2
148. Honeywell, Inc.	22	0	4	3	29
149. Honeywell Information Systems, Inc.	3	0	0	1	4
150. Hughes Aircraft Co.	54	0	3	6	63
151. ICI United States, Inc.	0	0	0	0	0
152. ITT Gilfillan, Inc.	1	0	0	0	1
153. Illinois Institute of Technology	6	0	2	0	8
154. Ingersoll-Rand Co.	0	0	0	0	0
155. Institute for Defense Analysis	5	0	0	2	7

CORPORATION		Reports Received by Category*				
		A	B	C	D	TOTAL
156.	Intercontinental Manufacturing Co.	0	0	0	0	0
157.	International Business Machines Co.	6	0	1	1	8
158.	International Harvester Co.	0	0	0	0	0
159.	International Telephone & Telegraph Corp.	1	0	1	1	3
160.	Interstate Electronics Corp.	0	0	0	0	0
161.	Itek Corp.	1	0	0	0	1
162.	Jackson Oil Co.	0	0	0	0	0
163.	Jacksonville Shipyards, Inc.	0	0	1	0	1
164.	Jet Services, Inc.	0	0	0	0	0
165.	Johns Hopkins Univ.	1	0	0	0	1
166.	Johnson A. Construction Co.	0	0	0	0	0
167.	J. A. Jones Construction Co.	0	0	0	0	0
168.	Kaiser Aerospace & Electronics Corp.	2	0	0	0	2
169.	Kaman Aerospace Corp.	1	0	0	1	2
170.	Keco Industries, Inc.	0	0	0	0	0
171.	Kentron Hawaii Ltd.	3	0	0	0	3
172.	Kings Point Mfg. Co.	0	0	0	0	0
173.	Kraft Inc.	0	0	0	0	0
174.	Kuras Alterman Corp.	2	0	0	0	2
175.	La Barge, Inc.	0	0	0	0	0
176.	Lansdowne Steel & Iron Co.	0	0	0	0	0
177.	Lear Siegler, Inc.	10	0	0	1	11
178.	Linkabit Corp.	0	0	1	0	1
179.	Lite Industries, Inc.	0	0	0	0	0
180.	Litton Industries, Inc.	6	0	1	1	8
181.	Litton Systems, Inc.	2	0	1	2	5
182.	Lockheed Aircraft Corp.	31	0	2	2	35
183.	Lockheed Electronics Co., Inc.	2	0	0	1	3
184.	Lockheed Missiles & Space Co., Inc.	27	0	4	1	32
185.	Lockheed Shipbuilding & Construc. Co.	1	0	0	0	1
186.	Logicon, Inc.	11	0	1	0	12
187.	Loral Corp.	2	0	0	1	3
188.	Magnavox Gov't & Ind. Electronics Co.	1	0	0	0	1
189.	Magnavox Co.	1	0	0	0	1
190.	Management & Technical Svcs. Co.	3	0	1	0	4
191.	Maremont Corp.	0	0	1	0	1
192.	Marine Transport Lines, Inc. (Subs GATX)	0	0	0	0	0
193.	Marinette Marine Corp.	0	0	0	0	0
194.	Marion Corp.	1	0	0	0	1
195.	Marquardt Co.	1	0	0	0	1
196.	Martin-Marietta Aluminium Sales Inc.	0	0	0	0	0
197.	Martin-Marietta Corp.	88	1	4	1	94
198.	Mason & Hanger, Silas Mascon Co.	2	0	0	0	2
199.	Massachusetts Institute of Technology	2	0	0	3	5
200.	Mason Chamberlain, Inc.	0	0	0	0	0
201.	Mayer Oscar & Co., Inc.	0	0	0	0	0
202.	McDonnell Douglas Corp.	41	0	1	2	44
203.	Metal Trades, Inc.	0	0	0	0	0
204.	Metric Systems Corp.	0	0	0	0	0
205.	Mine Safety Appliances Co.	0	0	0	0	0
206.	Minnesota Mining & Mfg. Co.	0	0	0	0	0
207.	Mitre Corp.	14	0	0	1	15
208.	Mobile Oil Corp.	3	0	0	0	3

CORPORATION	Reports Received by Category*				
	A	B	C	D	TOTAL
209. Motorola, Inc.	6	0	0	0	6
210. National Beef Packing Co.	0	0	0	0	0
211. National Steel & Shipbuilding Co.	1	0	0	0	1
212. Navajo Refining Co.	0	0	0	0	0
213. New Mexico State Univ.	0	0	0	0	0
214. Newport News Shpbldg & Drydock Co.	2	0	1	0	3
215. Norris Industries, Inc.	0	0	0	0	0
216. Northrop Corp.	35	0	4	2	41
217. Northrop Worldwide Aircraft Svcs.,Inc.	15	1	4	0	20
218. Northwest Airlines, Inc.	1	0	0	0	1
219. Norton Co.	0	0	0	0	0
220. O K C Trading Co.	0	0	0	0	0
221. Olin Corp.	0	0	0	0	0
222. Oshkosh Truck Corp.	1	0	0	0	1
223. PPG Industries, Inc.	0	0	0	0	0
224. Paccar, Inc.	0	0	0	0	0
225. Pacific Gas & Electric Co.	0	0	0	0	0
226. Pacific Northern Oil Corp.	0	0	0	0	0
227. Pan American World Airways, Inc.	5	0	0	0	5
228. Parker Hannifin Corp.	0	0	0	0	0
229. Parsons Ralph M. Co., Inc.	13	0	1	0	14
230. Pennsylvania State University	0	0	0	0	0
231. Perkin Elmer Corp.	0	0	0	0	0
232. Phillip Morris, Inc.	0	0	0	0	0
233. Phillips Petroleum Co.	0	0	0	0	0
234. Planning Research Corp.	25	0	0	2	27
235. Pneumo Corp.	0	0	0	0	0
236. Potomac Research, Inc.	3	0	0	0	3
237. Powerine Oil Co.	0	0	0	0	0
238. Pride Refining, Inc.	0	0	0	0	0
239. Proctor & Gamble Distributing Co.	0	0	0	0	0
240. Q E D Systems, Inc.	0	0	0	0	0
241. R & D Associates	3	0	1	1	5
*242. R C A Alaska Communications, Inc.	1	0	0	0	1
243. RAND Corp.	4	1	1	2	18
244. Raytheon Co.	22	1	4	1	28
245. Reflectone, Inc.	0	0	0	1	1
246. Remington Arms Co.	0	0	0	0	0
247. Reynolds R J Industries, Inc.	0	0	0	0	0
248. Right Away Foods Corp.	0	0	0	0	0
249. Rochester, Univ. of	2	0	0	0	2
250. Rockwell International Corp.	24	0	5	3	32
251. Rohr Industries, Inc.	1	0	0	0	1
252. Rosenblatt M Son, Inc.	0	0	0	0	0
253. SCI Systems, Inc.	1	0	0	0	1
254. S R I International	6	0	0	1	7
255. Salem Packing Co., Inc.	0	0	0	0	0
256. Sanders Associates, Inc.	5	0	2	1	8
257. Santa Barbara Research Ctr.	0	0	0	0	0
258. Science Applications, Inc.	42	2	4	2	50
259. Seaboard World Airlines, Inc.	0	0	0	0	0
260. Servidone Construction Corp.	0	0	0	0	0
* 241a. RCA Corp.	14	1	1	2	18

CORPORATION	Reports Received by Category* A	B	C	D	TOTAL
261. Shell Oil Co.	0	0	0	0	0
262. Sierra Research Corp.	0	0	0	0	0
263. Simplex Wire & Cable Co.	0	0	0	0	0
264. Singer Co.	7	0	1	1	9
265. Smith L H Oil Corp.	0	0	0	0	0
266. Southern Calif., Univ of	0	0	0	0	0
267. Southern Packaging & Storage Co.	0	0	0	0	0
268. Southern Union Refining Co.	0	1	0	0	1
269. Southwest Marine, Inc.	0	0	0	0	0
270. Southwest Truck Body	0	0	0	0	0
271. Southwestern Refining Co.,Inc.	0	0	0	0	0
272. Sparton Corp.	0	0	0	0	0
273. Sperry Corp.	26	1	2	0	29
274. Standard Mfg. Co.	0	0	0	0	0
275. Stanford Univ.	3	0	1	2	6
276. Stewart Warner Corp.	0	0	0	0	0
277. Summa Corp.	0	0	1	0	1
278. Sun Chemical Corp.	0	0	0	0	0
279. Sun Co., Inc.	1	0	0	0	1
280. Sundstrand Corp.	1	0	0	0	1
281. Supreme Beef Co., Inc.	0	0	0	0	0
282. Swift & Co.	0	0	0	0	0
283. System Development Corp.	13	0	1	2	16
284. Systems Consultants, Inc.	4	0	1	0	5
285. Systems Research Lab., Inc.	9	0	1	0	10
286. T R W, Inc.	48	1	6	2	57
287. Tektronix, Inc.	0	0	0	0	0
288. Teledyne Brown Engineering	6	0	1	1	8
289. Teledyne C A E	0	0	0	0	0
290. Teledyne Electronics	1	0	0	0	1
291. Teledyne, Inc.	3	0	0	0	3
292. Teledyne, Industries, Inc.	1	0	0	0	1
293. Teletype Corp. (Subs Western Electric)	0	0	0	0	0
294. Tesoro Alaskan Petroleum Corp.	1	0	0	0	1
295. Texas Instruments, Inc.	12	0	4	0	16
296. Texas, Univ. of	1	0	0	0	1
297. Textron, Inc.	9	0	1	0	10
298. Thiokol Corp.	5	0	1	0	6
299. Tiger International, Inc.	1	0	0	0	1
300. Todd Shipyards Corp.	0	0	1	0	1
301. Tonkawa Refining Co.	0	0	0	0	0
302. Total Petroleum, Inc.	0	0	0	0	0
303. Tracor, Inc.	8	1	2	1	12
304. Tracor Marine, Inc.	0	0	0	0	0
305. Trans International Airlines, Inc.	1	0	0	0	1
306. Treadwell Corp.	0	0	0	0	0
307. Trinidad Corp.	0	0	0	0	0
308. Turner Construction Co.&Ecoscience, Inc.	0	0	0	0	0
309. U T L Corp.	2	0	0	0	2
310. Union Carbide Corp.	2	0	0	0	2
311. Uniroyal, Inc.	0	0	0	0	0
312. United States Lines Co.(Sub Kidde Walter & Co.)	0	0	0	0	0

CORPORATION	Reports Received by Category*				
	A	B	C	D	TOTAL
313. United Technologies Corp.	22	0	1	0	23
314. Utah, Univ. of	0	0	0	0	0
315. Value Engineering Co.	3	0	0	0	3
316. Vanderbilt Shirt Co., Inc.	0	0	0	0	0
317. Vanguard Oil & Service Co.	0	0	0	0	0
318. Varian Associates	0	0	0	0	0
319. Varo, Inc.	0	0	0	0	0
320. Vought Corp.	15	0	1	0	16
321. Wallace B E Products Corp.	0	0	0	0	0
322. Walters, E & Co., Inc.	0	0	0	0	0
323. Washington, Univ. of	0	0	0	0	0
324. Watkins Johnson Co.	0	0	0	0	0
325. Western Electric Co., Inc.	3	0	0	0	3
326. Western Gear Corp.	0	0	0	0	0
327. Western Union International, Inc.	1	0	0	0	1
328. Western Union Telegraph Co.	3	0	1	0	4
329. Westinghouse Electric Corp.	16	0	2	1	19
330. Whittaker Corp.	0	0	0	0	0
331. Wilke William F., Inc.	0	0	0	0	0
332. Williams Clyde & Associates	0	0	0	0	0
333. Williams Research Corp.	1	0	2	0	3
334. Wilson & Co., Inc.	0	0	0	0	0
335. World Airways, Inc.	0	0	0	0	0
336. Wylie C E Construction Co.	0	0	0	0	0
337. Wyoming Refining Co.	0	0	0	0	0
338. Xerox Corp.	1	0	0	0	1
339. Zapata Marine Services, Inc.	0	0	0	0	0
TOTAL	1450	33	140	79	1702

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE
WASHINGTON D.C. 20301

MANPOWER
RESERVE AFFAIRS
AND LOGISTICS

(Military Personnel Policy)

SEP 19 1980

Honorable Walter F. Mondale
President of the Senate
Washington, D. C. 20510

Dear Mr. President:

This is in reference to our letter of April 28, 1980 forwarding the consolidated Defense Related Employment Report for FY 1979 as required by section 410(b) of Public Law 91-121 (83 Stat. 212).

Enclosed is a supplemental submission to the consolidated Report for FY 1979. The individual reports submitted pursuant to the cited law were received too late to include with our letter of April 28, 1980.

The enclosed summaries list the defense contractors alphabetically, and reflect the Military Department and Defense Agency within that alphabetical arrangement. The reporting categories A, B, C, and D referred to in those listings are:

A. Retired military officer - Maj/Lt Cmdr or above;

B. Former military officer - Maj/Lt Cmdr or above;

C. Former civilian employee whose salary was equal to or above the minimum GS-13, salary level;

D. Former employee of or consultant to defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

Copies of the individual reports submitted by the present or former officers or employees are also attached, grouped according to the Department or Agency with which affiliated, and arranged alphabetically by last name of the officer or employee.

TAB B-3

In accordance with section 410(f) of Public Law 91-121, a copy of these listings and reports will be available for public inspection in the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics).

Sincerely,

R Dean Tice

R. Dean Tice
Major General, USA
Deputy Assistant Secretary

Enclosures

SUPPLEMENTAL LISTING

Summary of Reports Submitted Under Section 410 Public Law 91-121

FY 1979

Number of Reports by Category Submitted by Departments & Agencies*

	A	B	C	D	TOTAL
AIR FORCE	138	6	9	1	154
ARMY	13	2	3	1	19
NAVY	227	3	20	20	270
NATIONAL SECURITY AGENCY	0	0	17	20	37
DEFENSE COMMUNICATIONS AGENCY	0	0	1	0	1
TOTALS	378	11	50	42	481

*A - Retired military officer - Maj/Lt Cmdr or above;

B - Former military officer - Maj/Lt Cmdr or above;

C - Former civilian employee whose salary was equal to or above minimum GS-13 during three years preceeding termination of service with DoD;

D - Former employee of, or consultant to, defense contractor who during last fiscal year was employed by DoD at salary equal to or above minimum GS-13 salary.

SUPPLEMENTAL LISTING

Statistical Summary of Reports Received by OSD Pursuant to Section 410, Public Law 91-121

Corporation	Reports received by category* A	B	C	D	Total
1. Advanced Technology, Inc.	14				14
2. Aerojet General Corp.	4				4
3. Aerospace Corp., The	1		1		2
4. Argosystems, Inc.	1		1		2
5. Automation Ind., Inc.	10			1	11
6. AVCO Corp.	1				1
7. Battelle Memorial Inst.	1				1
8. BDM Corp.	8				8
9. Beech Aircraft Corp.	1		1		2
10. Bendix Corp.			1		1
11. Boeing Aerospace Co.	6		2		8
12. Boeing Co.	8	1	2	2	13
13. Booz, Allen & Hamilton, Inc.	10			1	11
14. Borg-Warner Corp.	1				1
15. Brunswick Corp.	1				1
16. California Microwave				1	1
17. California, Univ. of	1				1
18. Computer Sciences Corp.	4			1	5
19. Control Data Corp.	7				7
20. Cubic Corp.	8			2	10
21. Data Design Lab.	8	1			9
Dayton, Univ of		1			1
Dynamics Research Corp.	1				1
EG&G, Inc.	3		1		4
25. Emerson Electric Co.	1				1
26. ESL, Inc.	2		1		3
27. E Systems, Inc.	7			1	8
28. Fairchild Camera & Instrument Corp.			1		1
29. Fairchild Ind., Inc.	1				1
30. Flinchbaugh Products, Inc.			2		2
31. FMC Corp.	1				1
32. Ford Aerospace & Communications	4				4
33. General Dynamics Corp.	21	1	1		23
34. General Electric Co.	5	1	1	3	10
35. General Motors Corp.	2	2			4
36. Global Assoc.	1				1
37. Gould, Inc.	1				1
38. Grumman Aerospace Corp.	3	1			4
39. Gulf Oil Corp.	1				1
40. Harris Corp.	2		1		3
41. Hawaiian Independent Refinery	1				1
42. Honeywell Inc.	5	1	1	3	10
43. Honeywell Info Systems, Inc.	1				1
44. HRB-Singer, Inc.			2		2
45. Hughes Aircraft Co.	13				13
46. ITT Gilfillan Inc.	2				2
47. Institute for Defense Analysis			1	1	2
48. International Business Machines Co.				3	3
International Harvester	2				2

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		Reports received by category*				
	Corporation	A	B	C	D	Total
	Int'l Telephone & Telegraph Corp.	1			1	2
	Interstate Electronics Corp.	1				1
52.	Jacksonville Shipyards Inc.	2				2
53.	Johns Hopkins Univ.				2	2
54.	Kentron Hawaii, LTD	1				1
55.	Lear Siegler, Inc.	2				2
56.	Linkabit Corp.				1	1
57.	Litton Ind., Inc.			1	3	4
58.	Lockheed Aircraft Corp.	8				8
59.	Lockheed Electronics Co., Inc.	1				1
60.	Lockheed Missiles & Space Co., Inc.	15			3	18
61.	Lockheed Shipbuilding & Const. Co.	2				2
62.	Logicon, Inc.	4		1		5
63.	Loral Corp.				1	1
64.	Magnavox			1		1
65.	Martin-Marietta Corp.	8		1		9
66.	McDonnell Douglas Corp.	15		1	1	17
67.	Massachusetts Institute of Technology				2	2
68.	Mitre Corp.				1	1
69.	Motorola Inc.	1				1
70.	National Steel & Shipbuilding Co	1		1		2
71.	New Mexico State Univ.	1				1
72.	Newport News Shipbuilding & Drydock Co.	1				1
73.	Northrop Corp.	3		5		8
74.	Northrop Worldwide Aircraft Svcs, Inc.	7				7
75.	Parsons, Ralph M. Co.	2	2			4
.	Planning Research Corp.	6				6
.	Potomac Research, Inc.	1				1
78.	R&D Associates	1		1		2
79.	Rand Corp.	1				1
80.	Raytheon Co.	6		1		7
81.	RCA Corp.	4		1	1	6
82.	Reflectone, Inc.	2				2
83.	Rochester, Univ. of	2				2
84.	Rockwell Int'l Corp.	14		1		15
85.	Rosenblatt M. Son, Inc.	1				1
86.	SRI International				1	1
87.	Sanders Assoc., Inc.	1				1
88.	Science Applications, Inc.	10		1	1	12
89.	Sierra Research Corp.	1				1
90.	Singer Co.	1				1
91.	Sperry Corp.	6		1		7
92.	Systems Consultants, Inc.	13		3	1	17
93.	System Development Corp.	2			3	5
94.	Systems Research Lab., Inc.	2				2
95.	Teledyne Brown Engineering	1		1		2
96.	Teledyne Ind., Inc.	3				3
97.	Texas Instruments, Inc.	4				4
98.	Textron, Inc.	1				1
99.	Thiokol Corp.	1				1
100.	Tracor, Inc.	11		3		14
101.	TRW, Inc.	11		1		12
102.	United States Lines, Inc.	1				1
3.	United Technologies	2				2
4.	Value Engineering Co.	13		3		16
105.	Vrought Corp.	2				2
106.	Westinghouse Electric Corp.	3		1	1	5
107.	Williams Research Corp.			1		1
	TOTALS	378	11	50	42	481

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The following table displays the requested statistics:

Competition vs Noncompetition
(Dollars in Billions)

	FY 78		FY 79		FY 80		6 mos. FY 81	
	$	%	$	%	$	%	$	%
Price Competition	$14.8	26%	$16.9	27%	$19.4	28%	$14.3	35%
Technical & Design Competition	6.1	10	5.7	9	5.7	8	4.1	10
Follow-on After Price Competition	1.3	2	1.3	2	1.4	2	.6	2
Follow-on After Design Competition	8.4	15	9.9	16	13.3	19	7.7	19
Catalog/Market Price	-------------Not Collected---------						1.2	3
One Source	27.1	47	28.3	46	30.6	43	12.7	31
Total Base	$57.7	100%	$62.1	100%	$70.4	100%	$40.6	100%

NOTE: Intragovernmental orders and contracts placed to fulfill foreign military sales are not included in the base. For FY 80 and future years, contracts for Corps of Engineers civil function are included in the base, and contracts awarded to educational institutions/non-profit institutions and contracts for utility services awarded to regulated monopolies are excluded. For FY 81 and future years, contracts for brand-name resale items and awards to SBA under Section 8(a) are excluded.

TAB C

Answer to Question 13:

a. Because the SAR reflects the budget, all costs displayed in the SARS, including estimating changes, are borne by the government. Data on the magnitude of costs absorbed by contractors in accordance with the cost sharing and ceiling provisions of contracts are not routinely collected.

b. Of the 47 systems in the December 31, 1980, SARs, 11 were in development and 36 were in production. Production is defined as having procurement funds in FY 1981 or prior.

c. & d. The following is a general explanation of the reasons for estimating changes as of the December 31, 1980, SARs. Also, included is information on the major procurement funded contracts. Although contract types are identified, we cannot readily determine which contracts include Economic Price Adjustment clauses.

1. PERSHING II

a. Phase: Development

b. Estimating changes, +$29.1M, (+$12.0M, FY79 $): Due primarily to the difference between OMB inflation projections and projections based on contractor experience. For complete details see the December 31, 1980, SAR, page 9.

2. M-1

a. Phase: Production

(1) Production status: 759 units funded through FY 1981.

(2) Major Production Contracts:

Chrysler, DAAK30-77-C-0007, Pre-production, 6/78, CPFF
Chrysler, DAAK30-77-C-0006, Productiond, 9/80, FPI
Chrysler, DAAK30-79-C-0009, Facilities, 2/79, COST
Chrysler, DAAK30-79-C-0004, Technical Support, 6/80, CPFF/AF

TAB D

b. Estimating changes, +$5238.7M (+$1535.8M, FY72 $): Due primarily to increases resulting from actual cost experience on the first two production contracts. The project managers believes that a signifcant part of this increase is due to the fact that the contract is experiencing much higher inflation rates than projected by OMB. For complete details see the December 31, 1980, SAR, pages 11 and 13.

3. DIVAD

a. Phase: Production

(1) Production status: Initial Production Facilities and Long Lead Items funded through FY 1981.

(2) Major Production Contracts:

Ford Aerospace, DAAK10-81-C-0093, Initial Production and Long Lead, 5/81, FPI

b. Estimating changes, +$61.8M (+$58.0M, FY 1978 $): Due primarily to change from a GOCO to COCO procurement strategy and reduction in FY81 funds causing a learning curve adjustment for low quantity penalties and the shift of Initial Production to FY81. For complete details see the December 31, 1980, SAR, pages 12 and 14.

4. COPPERHEAD (CLGP)

a. Phase: Production

(1) Production status: 6400 projectiles funded through FY 1981.

(2) Major Production Contracts:

Martin Marietta Aero, DAAK10-78-C-0070, Initial Prod, 12/77, CPIF
Martin Marietta Aero, DAAK10-79-C-0332, Production, 3/80, CPIF

b. Estimating changes, +$55.3M (+38.3M, FY 75 $): Due primarily to increased budgets required to fully finance Congressionally directed validation of TDP and results of a make or buy study that established a revised production concept requiring additional facilities/tooling. For complete details see the December 31, 1980, SAR, page 8.

5. M-198

a. Phase: Production

(1) Production status: 384 units funded through FY 1981.

(2) Major Production Contracts:

NOMAX Corp., DAAK25-77-C-0014, Production, 1/77, FP w/EPA (MYP)
Consolidated Diesel Electric, DAAA09-78-C-2006, Production, FP w/EPA (MYP)

b. Estimating changes, +$36.1M (+$26.2M, FY72 $): Due primarily to change in the fire control method, cannon production line set up, and increased manufacturing hour estimates for subsystems. For complete details see the December 31, 1980, SAR, pages 10 and 11.

6. MLRS/GSRS

a. Phase: Production

(1) Production status: 3714 M42 rounds and 44 self-propelled launchers funded through FY 1981.

(2) Major Contracts:

Vought, DAAH01-80-C-0681, Production, 4/80, FPI
Vought, DAAH01-80-C-0679, Production, 4/80, CPIF.
FMC, DAAK30-80-C-9053, Production Letter Contract, 8/80, FPI
FMC, DAAK30-80-C-0046, Production Letter Contract, 11/80, FPI

b. Estimating changes, -$227.1M (-$154.5M, FY78 $): Development changes due primarily to reestimates and reduced U.S. costs due to allies participation. Production changes due to decrease in round cost estimate. For complete details see the December 31, 1980, SAR, pages 10 and 11.

7. ROLAND

a. Phase: Production

(1) Production status: 38 fire units, 885 missiles funded through FY 1981.

(2) Major Productions Contracts:

Hughes, DAAK40-78-C-0164, Initial Prod.Facilities, 6/78, CPIF
Hughes, DAAH01-80-C-0008, Engineering Services, 11/79, CPAF
Hughes, DAAH40-79-C-0139, Low Rate Production, 10/79, FPIF
Hughes, DAAH01-81-C-A195, Low Rate Production, 12/80, FPIF
Hughes, DAAH01-81-C-0005, Low Rate Production, 12/80, FPIF
Boeing, DAAK40-79-C-0140, Low Rate Production, 10/79, FPIF

b. Estimating changes, +$540.8M (+$126.6M, FY75 $): Development changes due primarily to transfer of production funds to development by Congress. Production changes due to underestimate of fire unit cost, revised estimating methodology, revised estimates of engineering services and initial production facilities and change in the Deutsch Mark/$ conversion rate. For complete details see the December 31, 1980, SAR, pages 11 and 12.

8. HELLFIRE

a. Phase: Development

b. Estimating changes, +$393.8M (+$207.5M, FY75 $): Development changes due primarily to exercise of metric option and adjustment for application of December 1977 inflation indices. Production changes due to refinement of cost estimate and enhancement programs for warhead, seeker, and propulsion. For complete details see the December 31, 1980, SAR, pages 9 and 10.

9. AH-64

a. Phase: Development

b. Estimating changes, +$343.5M (+$29.9M, FY72 $): Due primarily to higher than anticipated learning curve on T700 engine and revised estimates in airframe, engine, and initial spares. For complete details see the December 31, 1980, SAR, page 10.

10. UH-60A (BLACK HAWK)

a. Phase: Production

(1) Production status: 337 units funded through FY 1981.

(2) Major Production Contracts:

Sikorsky, DAAJ01-77-C-0001, Production, 12/76, FPI(F)
Sikorsky, DAAJ01-77-C-0001, Option 1, 10/77, FPI(F)
Sikorsky, DAAJ01-77-C-0001, Option 2, 11/79, FPI(F)
Sikorsky, DAAJ01-77-C-0001, Option 3, 11/79, FPI(F)
General Electric, DAAK50-79-C-0003, Production, 10/78, FFP
General Electric, DAAK50-80-C-0004, Production, 1/80, FFP

b. Estimating changes, +$2205.1M (+$464.8M, FY71 $): Due primarily to use of revised cost estimating methodology: airframe production start-up problems: and, increased cost of materials, purchased parts, labor, and overhead. For complete details see the December 31, 1980, SAR, pages 10 and 12.

11. CH-47 MODERNIZATION

a. Phase: Production

(1) Production status: 9 units funded through FY 1981.

(2) Major Production Contracts:

Boeing Vertol, DAAK50-79-C-0006, IPF/LL, 4/80, FPI
Boeing Vertol, DAAK50-80-C-0029, Production, 10/80, FPI

b. Estimating changes, +$187.2M (+$63.6M, FY75 $): Due primarily to increases in airframe preparation, change allowance, updated avionics and engine. For complete details see the December 31, 1980, SAR, pages 8 and 9.

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12. SOTAS

a. Phase: Development

b. Estimating changes, +$981.3M (+$494.0M, FY79 $): Due primarily to increases based on ED experience in design, fabrication and test of system components. For complete details see the December 31, 1980, SAR, pages 12 and 14.

13. FVS

a. Phase: Production

(1) Production status: 400 IFV/CFVs, 790 25mm guns funded through FY 1981.

(2) Major Contracts:

FMC, DAAK30-77-C-0052, Development, 8/77, CPIF
FMC, DAAK30-78-C-0069, Development, 6/78, CPIF
FMC, DAAK30-80-C-0018, Production, 2/80, undefinitized
FMC, DAAE07-81-C-0046, Production, 11/80, undefinitized
Hughes, DAAK30-79-C-0018, Production (gun), 2/80, FPI
FAAC, DAAK30-80-C-0010, Production (ammo), 1/80, FPI

b. Estimating changes, +$5218.6M (+$3988.2M, FY72 $): Development changes due primarily to added scope for logistic support, TRACE funds, transmission back-up work and miscellaneous design improvement. Production changes due to revised estimate for IFV/CFV, increase in 25mm ammo cost, and increase in 25mm gun. For complete details see the December 31, 1980, SAR, pages 13, 14, and 16.

14. PATRIOT

a. Phase: Production

(1) Production status: 11 firing units funded through FY 1981.

(2) Major Contracts:

Raytheon, DAAK40-72-C-0100, Production and PEP mod, 10/77, CPIF
Raytheon, DAAK40-79-C-0082, Production Facilities, 3/79, CPFF
Raytheon, DAAH01-80-C-0002, Engineering Services, 2/80, CPFF
Raytheon, DAAH01-80-C-0001, Long Lead Materials, 11/79, CPFF
Raytheon, DAAH01-80-C-A215, Letter Contract, 11/80, CPFF
Raytheon, DAAH01-81-C-A256, Letter Contract, Long Lead Materials, 11/80, CPFF

b. Estimating changes, +$968.1M (+$521.4M, FY72 $): Development changes due primarily to allocation of PEP from production to development, program reorientation, and refined cost estimates. Production changes due to revised estimate, deletion of GFE, and deletion of construction funds. For complete details see the December 31, 1980, SAR, pages 17 and 18.

15. HARM

a. Phase: Development

b. Estimating changes, +$205.6M (+$129.0M, FY78 $): Due primarily to a reestimate of the program based on current contract cost data. For complete details see the December 31, 1980, SAR, pages 5b and 5c for the Navy and pages 6 and 7 for the Air Force.

16. PHOENIX

a. Phase: Production

(1) Production status: 2405 units funded through FY1981.

(2) Major Production Contracts:

Hughes, N00019,71-C-0817, Production, FY77, FFP
Hughes, N00019-78-C-0481, Production, FY78, FFP
Hughes, N00019-79-C-0333, Production, FY79, FFP
Hughes, N00019-79-C-0628, Production, FY79, FFP

b. Estimating changes, +$283.2M (+$72.0M, FY63 $): Due primarily to a repricing of production effort based on actual experience reflected in material cost, manufacturing support, tooling and test equipment and labor rates and the deletion of planned concurrent production of Iranian procurements. For complete details see the December 31, 1980, SAR, pages 5c and 5d.

17. SIDEWINDER (AIM-9M)

a. Phase: Production

(1) Production status: 480 units funded through FY 1981.

(2) Major Production Contracts:

Raytheon Missile Systems, N00019-81-C-0115, Production, 5/81, Letter Contract

b. Estimating changes, -$16.7M (-$8.7M, FY78 $): Due primarily to refined estimates based on prototype experience. For complete details see the December 31, 1980, SAR. page 5b for the Navy and page 7 for the Air Force.

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18. SPARROW (AIM-9M)

a. Phase: Production

(1) Production status: 2070 units funded through FY 1981.

(2) Major Production Contracts:

Raytheon Missile Systems, N00019-80-C-0404, Production, 9/80, FPI

b. Estimating changes, +$93.1M (+$21.9M, FY78 $): Due primarily to reprograming of funds to higher priority programs. For complete details see the December 31, 1981 SAR, page 5b for the Navy and page 7 for the Air Force.

19. 5-INCH GUIDED PROJECTILE

a. Phase: Development

b. Estimating changes, +$194.4M (+$82.1M, FY77 $): Due primarily to reestimate of the cost per round in the production phase of the program. For complete details see the December 31, 1980, SAR, page 5b.

20. E-2C

a. Phase: Production

(1) Production status: 71 units funded through FY 1981.

(2) Major Production Contracts:

Grumman, N00019-74-C-0040, Production, 1/75, FFP
Grumman, N00019-75-C-0326, Production, 9/75, FFP
Grumman, N00019-76-C-0016, Production, 6/77, FFP
Grumman, N00019-77-C-0022, Production, 4/78, FFP
Grumman, N00019-78-C-0020, Production, 3/79, FFP
Grumman, N00019-78-C-0487, Production, 6/80, FFP

b. Estimating changes, +$116.8M (+$75.7M, FY 68 $): Due primarily to increases in GFE material as a result of stretching program, and decrease in prime contractor's business base. For complete details see the December 31, 1980, SAR, page 56.

21. F/A-18

a. Phase: Production

(1) Production status: 87 units funded through FY 1981.

(2) Major Production Contracts:

General Electric, N00019-78-C-0063, Production, 11/79, FPI.
McDonnell Douglas, N00019-78-C-0526, Production, 5/80, CPIF.

b. Estimating changes +$8564.4M (+$3368.8M, FY75 $): Due primarily to increases resulting from actual cost experience with : airframe contract labor rates, material and tooling requirements; repricing RECCE and out-of-option CFE: engine contract: and other GFE and change allowances. For complete details see the December 31, 1980, SAR, pages 5c, 5d, and 5e.

22. F-14A

a. Phase: Production

(1) Production status: 443 units funded through FY 1981.

(2) Major Production Contracts:

Grumman, N00019-75-C-0078, Production, 12/75, FFP
Grumman, N00019-76-C-0084, Production, 7/77, FFP
Grumman, N00019-77-C-0032, Production, 5/78, FFP
Grumman, N00019-78-C-0019, Production, 3/79, FFP
Grumman, N00019-78-C-0523, Production, 7/80, FFP

b. Estimating changes, +$568.3M (+$419.5M, FY69 $): Due primarily to impact of Iranian procurement, various repricings and various factors as effected by Grumman. For complete details see the December 31, 1980, SAR, pages 5d and 5e.

23. P-3C

a. Phase: Production

(1) Production status: 218 units funded through FY 1981.

(2) Major Production Contracts:

Lockheed. N00019-78-C-0134, Production, 3/79, FFP
Lockheed, N00019-79-C-0083, Production, 8/80, FFP

b. Estimating changes, +$192.5M (+$93.1M, FY 68 $): Due primarily to refinements of requirements including ASP and repricing the out-year program as a result of actual cost experience. For complete details see the December 31, 1980, SAR, pages 5d and 5e.

24. LAMPS

a. Phase: Development

b. Estimating changes, +$1710.3M (+$731.7M, FY76 $): Due primarily to refinement of ship electronics, landing and traversing system procurement, and installation cost estimates. The increase also reflects the impact of projected change in the Army's Black Hawk procurement plan, and aircraft production procurement manufacturing process change. For complete details see the December 31, 1980, SAR, pages 5d, 5e, and 5f.

25. TOMAHAWK

a. Phase: Production

(1) Production status: 56 units funded through FY 1981.

(2) Major Production Contracts:

General Dynamics, N00019-76-C-0227, primarily FSED, small amount pre-production, production options, 3/8, CPIF

b. Estimating changes, +$265.1M (+$139.7M, FY77 $): Development changes due primarily to over estimate of impact of delaying production 1 year and additional funds needed to complete nuclear FSED through FY84. Production changes due to increased documentation costs for installation and maintenance of fire control and launch systems, erroneous ommission of the cost of 22 surface ship fire control and launch systems, and additional costs for production warranty specifications.

26. HARPOON

a. Phase: Production

(1) Production status: 1510 units funded through FY 1981.

(2) Major Production Contracts:

McDonnell Douglas, N00019-78-C-0141, Production, 3/79, FFP
McDonnell Douglas, N00019-79-C-0010, Production, 3/80, FFP
McDonnell Douglas, N00019-80-C-0157, Production, 2/80, FFP
Teledyne CAE, N00019-78-C-0264, Production, 5/78, FPI
Teledyne CAE, N00019-79-C-0170, Production, 1/79, FPI
Teledyne CAE, N00019-80-C-0130, Production, 7/80, FFP

b. Estimating changes, +$160.6M (+$97.9M, FY70 $): Development and Production changes due primarily to underestimation of tooling, ECOs and integration and assemly costs, recurring reliability/quality assurance costs, reduction from FMS, changes in mix of peripheral hardware, additional capsules and exercise sections, and additional seeker test equipment. For complete details see the December 31, 1980, SAR, pages 5b and 5c.

27. TACTAS

a. Phase: Development

b. Estimating changes, +$175.2M (+$66.4M, FY76 $): Development and Production changes due primarily to increased hardware procurement and contractor support cost and reestimate of contractor support and services cost. For complete details see the December 31, 1980, SAR, pages 5b and 5c.

28. PHM

a. Phase: Production

(1) Production status: 5 units funded through FY 1981.

(2) Major Contracts:

Boeing Marine, N00024-73-C-0257, Development, 2/73, CPIF
Boeing Marine, N00024-77-C-2051, Production, 10/77, FPIF

b. Estimating changes, +$32.7M (+$11.5M, FY73/74 $): Development changes due primarily to reduction of development effort, FRG and GOI cost share increases. Production changes due to labor learning curve slope increase, increased manhours, additional GFE components, and reestimate of contract expenditure profile and cost growth. For complete details see the December 31, 1980, SAR, page 5c.

29. DDG-47/CG-47

a. Phase: Production

(1) Production status: 4 ships funded through FY 1981.

(2) Major Production Contracts:

Litton, N00024-78-C-2316, Production, 9/78, CPAF
Litton, Production, 4/80, CPAF
RCA, N00024-78-C-5188, Production, 4/78, CPAF
RCA, Production, 8/80, CPAF

b. Estimating changes, +$1269.1M (+$627.1M, FY78 $): Development and Production changes due primarily to increased cost of high technology GFE. For complete details see the December 31, 1980, SAR, pages 5b and 5c.

30. TRIDENT

a. Phase: Production

(1) Production status: 9 units funded through FY 1981.

(2) Major Production Contracts:

Department of Energy, N0024-67-F-5110, Nuclear Prop., 10/72, EAO
Electric Boat, N0024-75-C-0214, Ship Const. Group I, 7/74, FPI
Electric Boat, N0024-75-C-0214, Ship Const. Group II, 6/77, FPI
General Electric, N00024-73-C-5235, Nuclear, 11/72, CPFF
Lockheed Missiles, N00030-78-C-0111, Missile, 11/77, CPIF
Lockheed Missiles, N00030-79-C-0116, Missile, 12/78, CPIF/CPFF

b. Estimating changes, +$435.6M (+303.7M, FY74 $): Due primarily to increases resulting from restructuring of missile production, repricing, and refining cost estimates. For complete details see the December 31, 1980, SAR, pages 5f, 5g, and 5h.

31. SURTASS

a. Phase: Production

(1) Production status: 8 units funded through FY 1981.

(2) Major Production Contract:

Tacoma Boatbuilding Co., N00024-80-C2046, Production, 9/80, FPE

b. Estimating changes, +$123.3M (+$73.2M, FY75 $): Due primarily to refinement of the production cost estimates for the ships and sonar. For complete details see the December 31, 1980, SAR, pages 5b and 5c.

32. SSN-688

a. Phase: Production

(1) Production status: 37 units funded through FY 1981.

(2) Major Production Contracts:

Newport News, N00024-76-C-2031, Production, 8/75, FPI
Newport News, N00024-77-C-2220, Production, 9/77, FPI
General Dynamics, N00024-71-C-0268, Production, 1/71, FPI
General Dynamics, N00024-74-C-0206, Production, 10/73, FPI
General Dynamics, N00024-79-C-2720, Production, 4/79, FPI

b. Estimating changes, -$777.3M (-$684.9M, FY71 $): Due primarily to refinement of estimates, changes in the procurement plan for deferred work and for settlements with General Dyamics. A decrease in procurement cost assumptions due to addition of three ships. For complete details see the December 31, 1980, SAR, pages 5b and 5c.

33. CVN-71

a. Phase: Production

(1) Production status: 1 unit funded through FY 1981.

(2) Major Production Contracts:

Newport News, N00024-80-C-2023, Ship Production, 9/80, FPI/FT
General Electric, N00024-74-C-5182, Nuclear Component Prod, 10/76, CPFF
D.O.E., N00024-67-F-5110, Nuclear Component Production, 10/76, CPFF
Westinghouse, N00024-73-C-5002, Nuclear Component Prod, 10/76, CPFF

b. Estimating changes, 0 (+$21.3M, FY79 $): Due primarily to an upgrading of estimates offset by decreases in estimated amounts to cover inflation. For complete details see the December 31, 1980, SAR, page 5c.

34. CAPTOR

a. Phase: Production

(1) Production status: 1150 units funded through FY 1981.

(2) Major Production Contracts:

Goodyear, N00024-76-C-6250, Production, CPFF
Goodyear, N00024-77-C-6079, Production, FPI
Goodyear, N00024-79-C-6018, Production, FPI
Goodyear, N00024-80-C-6178, Production, FPI

b. Estimating changes, +$382.0M (+$178.7M, FY71 $): Due primarily to increases as a result of changing from a 90% cost improvement curve to a 95% cost improvement curve and actual cost experience. For complete details see the December 31, 1980, SAR, page 5b.

35. FFG-7

a. Phase: Production

(1) Production status: 45 units funded through FY 1981.

(2) Major Production Contracts:

Bath Iron Works, N00024-77-C-2080, 3 ships, 2/77, FPIF
Bath Iron Works, N00024-77-C-2080, 3 ships, 1/78, FPIF
Todd Shipyards, N00024-77-C-2081, 3 ships, 2/77, FPIF
Todd Shipyards, N00024-77-C-2081, 3 ships, 1/78, FPIF
Todd Shipyards, N00024-77-C-2082, 2 ships, 2/77, FPIF
Todd Shipyards, N00024-77-C-2082, 2 ships, 1/78, FPIF
Bath Iron Works, N00024-79-C-2800, 3 ships, 4/79, FPIF
Bath Iron Works, N00024-79-C-2800, 3 ships, 4/80, FPIF
Todd Shipyards, N00024-79-C-2801, 3 ships, 4/79, FPIF
Todd Shipyards, N00024-79-C-2801, 1 ship, 4/80, FPIF
Todd Shipyards, N00024-79-C-2802, 3 ships 4/79, FPIF
Todd Shipyards, N00024-79-C-2802, 1 ship, 4/80, FPIF

b. Estimating changes, +$1348.3M (+$1072.5M, FY73 $): Due primarily to increases for Government Furnished Material: increases in shipbuilders' proposals in a reduced competitive market place (only three proposals were received for a three-yard requirement); provision for the price of sole-source negotiation to preserve option agreements for CFE and propulsion equipment for class standardization. For complete details see the December 31, 1980, SAR, pages 5c, 5d, and 5e.

36. GLCM

a. Phase: Production

(1) Production status: 11 units funded through FY 1981.

(2) Major Production Contracts: None as of December 31, 1980.

b. Estimating changes, +$231.2M (+$97.9M, FY77 $): Development changes due primarily to additional design work required for the Transporter Erector Launcher (TEL) and Launch Control Center (LCC) and a reestimate of these items. Production changes due to advantage of SLCM commonality and reestimate of TEL and LCC. For complete details see the December 31, 1980, SAR, pages 10 and 11.

37. PLSS

a. Phase: Development

b. Estimating changes, +$41.4M (+$18.6M, FY77 $): Due primarily to adjustment for escalation rates and prime contract cost growth. For complete details see the December 31, 1980, SAR, page 12.

38. IR MAVERICK

a. Phase: Development

b. Estimating changes, +$321.1M ($223.9M, FY75 $): Development changes due primarily to definitization of FSD contract, restoration of IR tests and second source, and adjustment for escalation rates. Production changes due to revised learning curve rates, and loss of learning due to laser program termination. For complete details see the December 31, 1980, SAR, page 9 to 10.

39. A-10

a. Phase: Production

(1) Production status: 687 units funded through FY 1981.

(2) Major Production Contracts:

Fairchild, F33657-73-C-0500, Production, 3/73, FPIF
Fairchild, F33657-76-C-0034, Production, 4/76, FPIF
Fairchild, F33657-78-C-0135, Production, 4/78, FPIF
Fairchild, F33657-79-C-0502, Production, 5/80, FPIF
General Electric, F33657-76-C-0001, Production, 8/75, FP Redeterminable
General Electric, F33657-79-C-0001, Production, 11/78, FP Redeterminable

b. Estimating changes, -$52.7M (-$122.9M, FY70 $): Due primarily to revised methodology and adjustments for prior year's escalation. For complete details see the December 31, 1980, SAR, pages 10 and 12.

40. ALCM

a. Phase: Production

(1) Production Status: 753 units funded through FY 1981.

(2) Major Production Contracts:

Boeing Aerospace, N00019-80-C-3000, Production, 4/80, FPIF
McDonnel-Douglas, N00019-79-C-3002, Production, 5/80, FPI

b. Estimating changes, +$496.8M (+$270.1M, FY77 $): Development changes due to increase in fly-off support costs and adjustment for prior year escalation. Production changes due primarily to reduced competitive incentives and reestimate of production costs based on more reliable data. For complete details see the December 31, 1980, SAR, pages 11 and 12.

41. F-15

a. Phase: Production

(1) Production status: 681 units funded through FY 1981.

(2) Major Production Contracts:

McDonnell Douglas, F33657-77-C-0200, Production, 4/77, FPIF
McDonnell Douglas, F33657-79-C-0779, Production, 7/79, FFP
Northrop, F33657-80-C-0027, Production, 1/80 FPP
Pratt & Whitney, F33657-75-C-0377, Production, 1/75, FPIF
Pratt & Whitney, F33657-79-C-0218, Production, 8/80, FFP

b. Estimating changes, -$99.5M (-$262.1, FY70 $): Due primarily to reestimate of the procurement program, withdrawal of funds for Rapid Deployment Forces and adjustments for prior year's Flyaway Actual costs and Flyaway Prior Year's Escalation. For complete details see the December 31, 1980, SAR, pages 12 and 14.

42. E-4A

a. Phase: Procurement

(1) Production status: 3 units funded through FY 1981.

(2) Major Contracts:

Boeing, F19628-74-C-0127, Development, 1/74, CPIF
Boeing, F19628-79-C-0184, Production, 9/79, FFP
Boeing, F19628-80-C-0034, Production, 6/80, FFP

b. Estimating changes, +$2.4M (-$21.3M, FY74 $): Development changes due primarily to system reestimate and, adjustment for actual escalation. Production changes due to repricing of A/C mods, C^3 equipment and commercial aircraft. For complete details see the December 31, 1980, SAR, pages 10 through 12.

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43. DSCS III (SPACE SEGMENT)

a. Phase: Production

(1) Production status: 1 unit funded through FY 1981.

(2) Major Production Contracts:

General Electric, F04701-80-C-0058, Production, 10/80, FPIF

b. Estimating changes +$33.2M (+$10.6M, FY77 $): Due primarily to increases for; revised launch vehicle first time integration and satellite contractor integration tasks on Titan IIID/IUS and STS/IUS; engineering efforts, Shuttle/IUS compatibility and safety; and, revised estimate for inefficient buy plan. For complete details see the December 31, 1980, SAR, pages 11 and 12.

44. NAVSTAR GPS

a. Phase: Development

b. Since the December 31, 1980, SAR was the initial SAR submission, there were no Estimating Changes.

45. EF-111A

a. Phase: Production

(1) Production status: 19 units funded through FY 1981.

(2) Major Production Contracts:

Grumman, F33657-79-C-0068, Production, 3/79, FFP
Raytheon, F33657-78-C-0672, Production, 2/79, FFP
Sundstrandt, F33657-79-C-0011, Production, 2/79, FFP
American Electronics Labs, F33657-79-C-0043, Production, 2/79, FFP

b. Estimating changes, +$112.9M (+$43.8M, FY73 $): Due primarily to revised estimating methodology derived from experience and an adjustment for prior escalation. For complete details see the December 31, 1980, SAR, pages 12, 13, and 14.

46. E-3A (AWACS)

a. Phase: Production

(1) Production status: 27 units funded through FY 1981.

(2) Major Production Contracts:

Grumman, F33657-79-C-0068, Production, 3/79, FFP
Raytheon, F33657-78-C-0672, Production, 2/79, FFP
Sundstrandt, F33657-79-C-0011, Production, 2/79, FFP
American Electronics Labs, F33657-79-C-0043, Production, 2/79, FFP

b. Estimating changes, +$112.9M (+$43.8M, FY73 $): Due primarily to revised estimating methodology derived from experience and an adjustment for prior escalation. For complete details see the December 31, 1980, SAR, pages 12, 13, and 14.

47. F-16

a. Phase: Production

(1) Production status: 695 units funded through FY 1981.

(2) Major Production Contracts:

General Dynamics, F33657-75-C-0310, Production, 7/75, FPIF
General Dynamics, F33657-75-C-0310, Option 5, Production, 11/78, FPIF
General Dynamics, F33657-78-C-0668, Production, 5/79, FFP
Pratt & Whitney, F33657-75-C-0337, Production, 11/78, FPIF
Pratt & Whitney, F33657-80-C-0218, Production, 8/80, FFP

b. Estimating changes, -$586.9M (-$480.6M, FY78 $): Due primarily to a program estimate revision and adjustments for prior year's escalation. For complete details see December 31, 1981, SAR, pages 11 and 12.

Senator ROTH. Senator Cohen.

OPENING STATEMENT OF SENATOR COHEN

Senator COHEN. Mr. Chairman, I have just a couple of remarks. First of all, I agree with you that our defense posture is in a state of disarray. There is a multiplicity of reasons for that disarray, not the least of which is the role of Congress in the entire process of authorization and appropriation. The road to reform is paved with good intentions, and I would say that every Secretary of Defense who has taken office has had the good intention of reforming DOD's way of procuring military equipment and services.

But each time a reform is instituted, somehow it, in turn, is in need of further reform by another and newer administration. I want to say on behalf of Mr. Carlucci, the Deputy Secretary of Defense, that I don't know of anyone who is more dedicated, other than perhaps the Secretary of Defense, to saving money. I should say for the record that I was one who wanted to institute these oversight proceedings, along with the chairman, because we are concerned about the level of spending and about the depreciation of military equipment.

I would say that no one has been more responsive to the kind of concerns that you, Mr. Chairman, have talked about here this morning and we talked about at our last hearing than Mr. Carlucci and those who work with him. I think there are some valid reasons that will be offered here this morning as to why we are in such bad shape. I think the record will show that defense contractors buy into the defense business. I also think the Pentagon buys into the defense business. Mr. Carlucci will probably agree that we have too many weapons systems, that we have underestimated their costs deliberately in order to see they are funded by the Congress. Then as time goes on, we are presented with a bill and say, "My God, we can't afford all of these programs."

In my judgment, we are never going to come to grips with the problem of procurement until a decision is made—not at the congressional level but at the Secretary of Defense's level—as to what weapon systems we need and what weapon systems we can afford. Moreover, the Secretary of Defense must base that decision upon actual, real cost estimates—as realistically as we could possibly develop. That is the only way, in my judgment, that we will ever get a handle on our procurement problems.

At the time the issue comes before Congress, I think it is too late. We can exercise oversight and make recommendations to change regulation and DOD practices, but the fact of the matter is, once these programs are under way and once they have a constituency that is built up, it is virtually impossible to terminate them. And when I mentioned before that Congress has a role to play, it has not always been a constructive role; it has sometimes been a negative role. After weapons systems are proposed, funded, researched and developed, there may be no need for that particular system. Yet the constituency has been built up right here in Congress and we who are now looking to chastise the Defense Department are the first ones to say "Don't terminate that particular program." So I do not think we should mount any kind of a platform of piety here today, or at any time, but rather, we ought to accept some of the responsibility for the kind of disarray that exists within our defense system.

And having said that, I want to show you, Mr. Chairman, that I am equally dedicated to doing whatever we can to reform our system. I think there will be some very constructive recommendations coming out of this committee based upon the testimony we heard last week, what we will hear today and in the future hearing.

Thank you very much.

Chairman Roth. Thank you, Senator Cohen.

Senator Mattingly.

OPENING STATEMENT OF SENATOR MATTINGLY

Senator Mattingly. Of course, I am pleased to be here at the second session of hearings on the Department of Defense's acquisition process. As many of the departments of the Federal Government, this agency has been strife with mismanagement. We heard that earlier attempts to clean up the DOD cost-effectiveness process has, through no fault or misintentions, failed. I would guess that the road to cost overlays is paved with a lot of good intentions, but very few good managers.

But I would like to keep these hearings in proper perspective also, Mr. Chairman. It would be one thing if we were asking the Department of Defense to work under perfect market conditions in an environment which encourages competition, one with few regulations and where we had a more perfect knowledge of the rate of inflation.

Unfortunately, we are working under imperfect conditions. Just as the private sector must deal with business cycles, the various bureaus of the Government and the projects that are supervised at the agencies are subject to political cycles.

In armaments acquisition we have the problem of high turnover of the administration in power. There has been over 20 years since we had a President in term for the full 8 years of a double term. Different administrations often have conflicting opinions on the proper defense posture for our country and, of course, often world events make it imperative that a new defense direction be chosen.

I think we are today witnessing such a tide in the affairs of men. I believe the Defense Department has been taking proper measures both to insure our security and to see that the money spent on defense is wisely spent.

Secretary Carlucci's April memo, far from being naive as earlier witnesses have suggested, states basic and fundamental guidelines for a successful procurement process. He outlines the good public management procedures that so many of our witnesses, including Dr. Lynn of Harvard, so loudly called for. I applaud Secretary Carlucci's efforts in the past and look forward to working with him to see that the Department of Defense is even more streamlined so that ultimately the taxpayers get the biggest bang for their buck.

But this will be a bang, I feel, that the world will never hear. Our purpose here, lest we forget, is to make this Department a truly successful Defense Department. Through properly protected and armed personnel we will never have to face an enemy in a major confrontation.

Thank you, Mr. Chairman.

Chairman ROTH. Senator Rudman.

Senator RUDMAN. I don't have any opening statement.

Chairman ROTH. Thank you.

Senator Pryor?

Senator PRYOR. I have no opening statement.

Chairman ROTH. Mr. Carlucci, we will now be happy to receive your statement.

It will be the rule of this committee today that if you choose to summarize your statement, we will incorporate your full statement as if read.

TESTIMONY OF FRANK C. CARLUCCI, DEPUTY SECRETARY, DEPARTMENT OF DEFENSE, ACCOMPANIED BY GARY CHRISTLE, COMPTROLLER'S OFFICE, JOHN SMITH, RESEARCH AND ENGINEERING OFFICE AND MILTON A. MARGOLIS, DEPUTY ASSISTANT SECRETARY FOR PROGRAM ANALYSES AND EVALUATION

Mr. CARLUCCI. Thank you very much, Mr. Chairman, members of the committee.

It is a pleasure to be with you today.

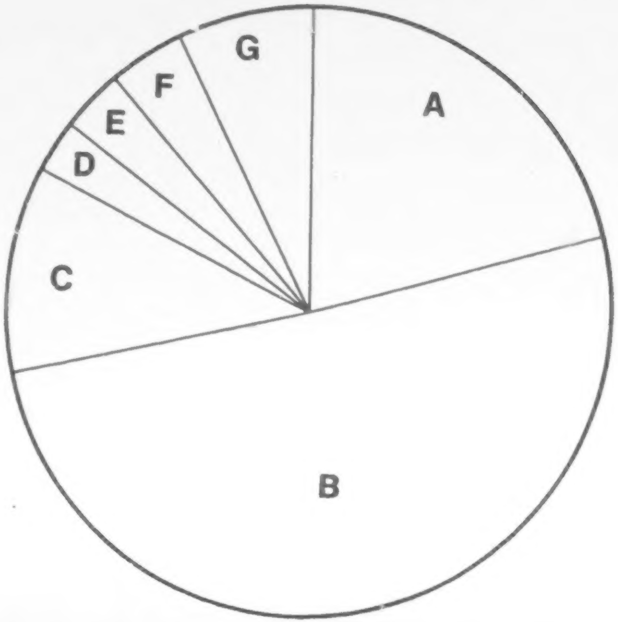
I do have a complete statement. I would ask, Mr. Chairman, that it be submitted for the record. I will give a brief summary of that statement and then I will try to address some of the concerns you and Senator Cohen expressed at the outset of the hearing.

I think we are all familiar with the problems that we have inherited in DOD—program instability, reduced quantities, program stretchouts, the buy-ins, that Senator Cohen referred to, and I would agree with you, Senator Cohen, buy-in has been the practice of the contractors and of the Defense Department program managers, as well, and it has been very harmful—excessive paperwork, excessive regulations, the Procurement Commission pointed to excessive regulations, bottlenecks, shrinking industrial base. We have to bear that in mind when we look at such things as the chart you have over there.

The principal impact of all of this has been reflected in cost growth and where does this cost growth come from? Well, we have a chart over there which is an analysis of where the growth comes from.

[The chart referred to follows:]

COST GROWTH BY CATEGORY
Selected Acquisition Report
June 30, 1981



A - ECONOMIC INFLATION = 20.7%
B - PROGRAM CHANGE
RELATED ESC = 50.6%
C - QUANTITY = 10.9%
D - ENGINEERING = 2.8%
E - SUPPORT = 3.2%
F - SCHEDULE = 4.0%
G - ESTIMATING AND OTHER = 7.8%
TOTAL =100.0%

Mr. Carlucci. Unpredicted inflation accounts for about 70 percent of total cost growth. That is the part in A and B. B is the cost growth associated with program change, and that is much higher than A because when you have a program change and calculate the inflation, you have to go back to the base year. But you can see that inflation accounts for approximately 70 percent of total cost growth.

The other factors are quantity and schedule changes frequently caused by a lack of funds. Unrealistic cost estimates, Senator Cohen pointed to that, and the increasing length of the acquisition cycle, changes in the nature of the threats and requirements and high cost of technology itself.

We have laid out a program to try and cope with these problems. Basically, the program consists of a series of management principles that are just plain common sense—improved long-range planning, delegating authority and accountability to appropriate levels, using lower risk approaches which stress economy and production, being realistic about costs, emphasizing readiness and sustainability as much as other factors, and building up our industrial base through good business practices, which emphasize the use of competition. The 32 initiatives with which the committee is familiar reflect our belief in these principles and when implemented, we believe they will stabilize the acquisition process and lead to lower costs.

So far I think we are off to a reasonable start. With your support, I think we can go a lot further.

Let me summarize for you our progress so far. One critical area, perhaps the most critical area, is improving program stability. And the services have provided to us a list of programs to which we are making a management commitment to provide stable funding.

Our target is to have a list of about 30 programs. Now, to fund these programs, to provide for stable funding of these programs, we recognize that we are going to have to make some hard decisions and cut programs of lower priority. Senator Cohen is absolutely right when he says there are too many weapons systems in the budget for the resources that are available.

During this year's budget review, we have identified about $1.8 billion in program reductions for fiscal year 1983 and about $7.5 billion over the 5-year program period.

These reductions, history indicates, are very difficult to bring about. Members of Congress, for example, are often concerned about phasing out production lines, but I think we all have to face up to this problem if we are going to provide for stable funding of these programs that we want to keep in the budget.

New programs as well are receiving close scrutiny by the reconstituted Defense Resources Board because we don't want to make our problem worse before we make it better.

Stability we think will be enhanced and costs reduced through multiyear contracting. Our experience has demonstrated that we can achieve 10 to 20 percent savings through the improved economies of scale, lot buying that come with multiyear contracting. We are proposing to the Congress multiyear contracts for the F-16, C-2, Blackhawk and troposcatter radio this year, and we estimate this will lead to about $400 million in savings.

We think an evolutionary approach to technology will help reduce costs, acquisition time and improved supportability, and our program for preplanned product improvement (P^3I) stresses this approach. The Services have identified about 40 programs where P^3I can be applied. We think we can achieve further reductions in time and cost through streamlining the acquisition process, emphasis on front end planning, reducing administrative costs through revising acquisition thresholds to reflect the current state of the economy. We have simplified the DSARC system. We are looking at the regulatory burdens to see if there are ways that we can cut back on those. We think we can solve a number of problems by improving our relations with industry.

We think we can increase productivity through such measures as accelerated equipment depreciation and contract incentives resulting from productivity investments. We have raised progress payment by 10 percentage points and implemented flexible progress payments which improves the cash flow environment and we will be making substantial investments in the industrial base over the next 5 years.

We are intensifying, Mr. Chairman, our efforts to promote competition. You cited statistics during the 1970's which indicated a drop in competition. Our procurements resulting from price or design competition have risen from 36 to 42 percent during the first 9 months of fiscal year 1981. Followons have risen from 21 to 24 percent. The majority of our funds are awarded as a direct or indirect result of competition, and I am sure a subject we will want to explore more thoroughly in the question and answer period.

To insure that our efforts result in progress, we have placed substantial emphasis on implementation. You will note in our original 32 points we put out, one of those points was implementation. The Under Secretary for R. & E. has been tasked with the responsibility of implementing the program. I am chairing a newly established DOD Council on Integrity and Management Improvement. We have instituted a series of secretarial performance reviews to deal directly with the Services on these management subjects.

To summarize, in 6 months we have introduced a new philosophy and new directions in acquisition in the Pentagon. We believe that through their implementation we can obtain our goals—more weapons, sooner at less costs, weapons which we can support and maintain. I think we have made important progress in a short time, but we will need your help and cooperation to see it through.

Mr. Chairman, let me just make a couple of observations on the two charts you have up there and a couple of comments on your opening remarks. I agree with the chart on the left, comparison of United States and Soviet weapons produced.[1] There is no question but that the Soviet Union is out-producing us in a number of fields. That is due, however, to a variety of reasons, the most important of which is that they, are putting on a comparable dollar basis, somewhere in the neighborhood of 80 percent, more funds into military investment than we are.

And they have been so doing over the past 5 years. Moreover, they have had a steady growth, steady real growth in their defense budget of 4 to 5 percent over a sustained period while our real growth has either been level or increasing only slightly, as you are probably aware. They are putting somewhere in the neighborhood of 14 percent of their gross national product into defense compared with some 5.6 percent of ours. They have steady budgets which makes it much easier to do. All they have to do is to give a directive and the weapon system will be produced.

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[1] See p. 195.

They don't have to worry about that consensus that you spoke of, and their industrial base has not dried up. On the contrary, it has expanded while ours has been drying up as a result of the stops and starts in the budget process and our failures to do business in a sensible way with the defense industry.

With regard to the second chart, we see the line goes up rather steeply.[1] As best we can tell, the basis for that line is DSARC milestone I in our process, which is at the very inception of our programs. At the inception of our programs it is extremely difficult to get any kind of accurate cost estimates. In fact, estimates at that stage are little more than budgetary figures. The chart also includes, of course, inflation, as I indicated in my prepared remarks. Inflation accounts for some 70 percent of cost escalation.

In your comments, Mr. Chairman, you referred to too many gold-plated systems. We agree, which is why we have introduced the preplanned product improvement program. As I indicated, we will probably identify some 30 to 40 programs for P^3I. We are emphasizing the evolutionary approach to weapons systems. As far as waste and fraud is concerned, Mr. Chairman, we have taken very vigorous steps to cope with waste and fraud. We have established the position of Assistant to the Secretary for Review and Oversight, which is analogous to the Inspector General functions in other agencies. Mr. Joe Sherrick, who is with us today, is the incumbent in that position and he has full authority. We will support the concept of legislation to establish the Inspector General. We do have a difference on the reporting lines of command for that Inspector General because we are a military organization.

We do think it needs to be under the direction, authority and control of the Secretary.

Mr. Chairman, we are not opposing Senator Nunn's proposal and we are making an effort to work these programs out with him. We are afraid that the proposal as it stands sets up a dual reporting system. It has got some problems of definition in it. We want to clarify whether cost escalation, due to inflation, per se, can trigger the reporting mechanism. We are concerned that the proposal, as it now stands, bypasses the Secretary, Deputy Secretary, and Under Secretary of Defense.

We see no mechanism for starting programs up again once they are stopped under this amendment. We are worried that the amendment could trigger reports out of the Defense Department before we have had a chance to review these reports and provide recommendations to the Congress. In this connection, there is a definition in this amendment that when the program manager has reason to believe that there will be cost escalation, he must trigger a report. We think that needs to be clarified.

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[1] See p. 197.

We would be glad to work with Senator Nunn or any other members to develop a satisfactory amendment.

You commented that you had heard a rumor that our policy is to get equipment as fast as possible regardless of cost. I can say authoritatively, Mr. Chairman, that that is not our policy. I would simply refer to the preamble of our 32 points which lays out very clearly our goals and indicates the lowest possible cost consistent with performance, sustainability, and adequate production schedules. So I think we share your sense of values.

Mr. Chairman, that concludes my opening remarks. Let me introduce the backup witnesses that I have with me. Mr. Gary Christle from our Comptrollers Office and Mr. John Smith from our Research and Engineering Office.

Chairman ROTH. Thank you, Mr. Carlucci. Let me just make two or three general observations. First of all, I would agree with my colleague, Mr. Cohen, I think in some of the things that you have said, that part of the problem lies with Congress. I think that the political climate back home is such that you ought to go ahead and move because I think you will find a lot of support both in the public and here on the Hill to do some of these things that have not been politically feasible in the past because of opposition on the part of Members of Congress.

I would also urge you to bring forth, as we have special responsibilities in this committee for procurement, as to how we can simplify and improve upon the legal requirements. I am concerned that in the defense procurement, as elsewhere in the private sector, that we have built so many regulatory requirements because of a bad example that the net effect has been to impede both cost reduction as well as flexibility in the procurement procedures.

So we will be most happy to work with you in this area.

I don't, at least personally, want to get involved in any long discussion either on the Inspector General or the Nunn proposal. We will be having some future markups. I will say from my standpoint, the military argument does not wash. It does not wash because what we are trying to maintain is civilian control of the military. It seems to me the I.G. is one possible vehicle to help do that. For the same reasons, the Nunn amendment is being dealt with in conference. My only point in bringing the Nunn amendment up here is that to me it is a very practical step—in fact I think the best step—that has been taken in 10 years to create an incentive for the services to not underestimate the cost of major weapons.

I think it can be very helpful in discouraging overruns. I would just say that I think this is an extremely creative idea. There may be some problems with its mechanism or details, but I would urge you to try to work those out so that the principal thrust of the Nunn amendment can be accomplished.

One other point, Mr. Secretary, you are absolutely right that that exhibit is based upon the initial estimates, but I would also say that even if you go to development costs, there has been a tremendous rise, roughly 110 percent, so I don't think that any of us can sit back and be satisfied. I fully understand the problem of maintaining efficient procurement is a continuing one, and I recognize that 10 years from now we will probably be dealing with the same problems. The committee will adopt a 10-minute rule and we have what we call the early bird rule which permits the Senators to question you in the order in which they come into the conference.

Mr. Carlucci, as you may have gathered, one of my principal concerns is to maximize the use of competition. It is my concern that, just a little bit like motherhood, everybody talks about it but we don't do as much as we should to insure that competition is used wherever practical. I agree that the law creates a number of exceptions, but I am worried that these exceptions are the norm and that brings me to two lines of questioning. One is with respect to the items that are close or related to products in the commercial market. I think it is very important that we buy commercial where we can. It is my understanding that we have something like 40,000 specifications that in many of these areas we require special items to be purchased where in the majority of cases commercial items may well do the job.

I wonder what we can do to simplify these specifications and make the fixed price competitive procurement the standard?

The other side of the coin, the much more difficult one which, of course, is where most of the big bucks are is in the extraordinarily complicated weapons systems. For example, I understand that recently DOD has decided to award a $600 million sole source production contract to a major defense contractor for the production of the Trident 2 missiles. Why, when we have numerous examples of competition in the production phase of many DOD missiles, such as the AIM 7, 9, DRAGON and WALLEYE, couldn't this have been awarded competitively? Today we are talking about purchasing 100 B-ls at a cost at least of $30 billion. What are we doing to determine whether or not dual sourcing in these cases may not be desirable? Is this a conclusion that is made without detailed study, or do we try to determine, for example, what the cost of the second source would be?

The reason that I am concerned about this, is that once you become the sole source, there is really very little incentive on the part of the major contractor to try to maintain low costs. He has got the—well, take the B-1 for example. You have 100 airplanes that will cost $20 billion to $30 billion. I wonder what we can and should be doing to maximize the use of competition in both these types of procurement?

Mr. Carlucci. Mr. Chairman, we agree that we ought to maximize use of competition, and I have put out a directive to the Services asking them to set goals for competition. They are responding enthusiastically. But let me just make a couple of comments about competition because, as you pointed out, it is not a panacea.

First of all, when you look at the Defense Department figures, you have to understand what is in them and what isn't. On a dollar volume basis, some 69 percent of our money goes by way of competition. On a number of contracts basis, that figure is about 40 percent. Now, included in that 69 percent figure are price competition, technical and design competition, and the followon contracts. Buying a defense weapon system is not like buying automobiles or office furniture. You have to start out at the beginning of that curve, at the R. & D. stage, at concept formulation.

Frequently we look at two or three contractors at that stage and conclude that the only way we can get the concept formulation that we need is to go with a cost plus contract. By definition, a cost plus contract is not included in our figures on price competition. Hence, a large number of our weapons systems that R. & D. looked at in a price competitive sense are not classified as competitively bid in the figures that you are looking at. There are other problems.

In many cases, we don't have the contractor base to compete. There is only one private shipyard that can produce a nuclear carrier. Right now we are having trouble getting competitive bids from petroleum suppliers. We do have to make some exceptions. In the programs that you mentioned, on the Trident II, while the Navy is not competing the prime contract because they want to hold the management team together in the follow-on weapons system, there is an intent to compete all the subcontracts.

The B-1 was originally competed. We could look at the possibility of competing it again but that would mean a substantial investment in plant and equipment and would almost certainly mean a delay of 1 to 2 years in the IOC of the B-1.

We agree that we ought to look at dual sourcing wherever that is feasible, and we do that. We have a system for looking at dual sourcing. We have no negotiated contracts without appropriate supervisory review and we have given emphasis to the possibility of dual sourcing.

Chairman ROTH. Mr. Secretary, on that last point, I recognize and understand many of the difficulties in having competition of these extraordinarily complex weapons systems, ships, planes, or whatever it may be. It is my understanding, for example, that in Germany that they have a separate office for research and development of Navy ships. Once the development phase is done, then they competitively bid the production contract.

It is my understanding that they almost always have dual source for the production aspect of the contract. So I guess my question is, Why can they do it and we can't?

I am not arguing that we should or should not in the case of B-1, but I am questioning whether we do sit down prior to—Congress will be in the process of considering whether or not to make this commitment, do we make any real study to try to compare costs of procuring those 100 planes from a sole source in contrast with dual source, or do we just assume that because of its complexity, that is unrealistic and not move in that direction?

Mr. CARLUCCI. We make the appropriate studies, Mr. Chairman, and the key to this question is to examine the contract early on and see if it is feasible to go with dual sourcing.

In many cases, where you have large weapons systems that require enormous investments in plant and equipment, it is just not feasible either from the standpoint of resources or time to go to dual sourcing. But wherever it is feasible, I can assure you we make a serious effort to study that possibility and where we can do it, we do it. Once again, while helpful, dual sourcing is not a panacea.

Germany has had its problems with the Tornado aircraft, a well-known case of enormous cost overrun. It is not always the cheapest way at the outset to go dual sourcing. You often need more money in the budget to start with for that investment up front in nonrecurring costs.

So we have to weigh all of these factors, but I can assure you we do——

Chairman ROTH. Let me ask you this, Mr. Secretary—my time is up—do we, in fact, make an analysis and establish an estimate of the comparative cost of sole source, with competition?

Do we actually do that, and are those studies made available to Congress?

Mr. CARLUCCI. Yes, we make those studies and we can make basic information available to Congress. There is a problem in making all of the information available to Congress because frequently we are in very difficult negotiations with contractors, and if the contractors know via open congressional hearings, or whatever other source they may have, what our negotiating position is, it often makes it more difficult to achieve our goals.

But we would be glad to work with you in providing what ever information you need.

Chairman ROTH. My time is up.

Senator Cohen?

Senator COHEN. Thank you.

I think part of the difficulty is many of us are looking for simple solutions to this problem.

For example, I share the Chairman's desire to go to as many fixed-price contracts as we can. Yet according to an article that appeared in the Washington Post a couple of weeks ago by Mr. Morton Mintz, a fixed-price contract is not the best contract for all defense programs. Mr. Rule, who will be testifying later, stated in the article that the fixed-price contract was the wrong type of contract for the Trident program. According to the article, voices were raised, including Mr. Rule's, saying that DOD should not proceed on this basis. He was right. And now we have significant problems with the Trident which just recently have been resolved between the Navy and the boatyard itself.

In addition, we have problems even when there is competition. My friend, Senator Pryor raised an ad in the paper from the Washington Post the other day that showed Bath Iron Works. One of their standard ads says, "We produce it faster and ahead of schedule." Well, by right, they should get all the contracts for the frigate program.

Senator PRYOR. I don't want the taxpayers paying for those ads, that is what I am saying.

Senator COHEN. Somebody is paying for everything, Senator Pryor. The point is they should get all the contracts—in theory. As a matter of practice, however, we have to keep open some other yards, even though they are not producing as efficiently and productively. I recognize that. If you eliminate all the other yards, then you eliminate competition.

Another of the problems, as I see it, is the fact we tend to develop brand new systems instead of modifying existing ones. I think the F-18 is probably a classic case of that. We have seen the F-18 system go from a $1.9 billion program to a $30 billion program despite the fact we have serious questions as to whether or not it has a marked level of improvement, as far as fleet protection, over the F-14, or whether it has any superior ground attack ability over, let's say, an A-7A or A-6E.

As I mentioned last week, I think it was Australia who has decided they would like to have 50 of those aircraft.

Mr. CARLUCCI. That is right.

Senator COHEN. Obviously the manufacturer is not going to produce 50 aircraft at that price.

Another problem is the political process.

For example, we know that we do not have enough strategic airlift or sealift. We know that there is a proposal to build a new CX transport plane.

When that matter came before the Armed Services Committee with an authorization request for some $250 million, there was no sentiment for it. We had not even seen the plans yet. There were people, myself included, raising questions about why we need a new CX transport plane. The answer was because the big ones we have now cannot land on small runways. You raise the question, why not lengthen the runways?

That is not really a valid option, yet I have never been satisfied as to why that is not a valid option. In any event, here you have a new system called the CX, which is going to carry a very big price-tag on it. I received a whole lot of mail from my constituents saying, "You are against the national defense of this country if you deny a request of $250 million." That is part of the political process. That is how we get so many systems that we don't need. Though we need some more strategic airlift, I have not been satisfied that we need a whole new system.

Another issue that comes to mind, and I think Dr. Gansler is going to testify to this is the deteriorating U.S. defense industrial base.

Dr. Gansler has written extensively about the fact that the United States contracts out to foreign countries for items that are produced here in this country. It brings to mind a problem I am familiar with in which the Air Force currently is proposing to do R. & D. work in France for a U.S. strategic system, namely, a special weaving process we use on the nose cones of our strategic missiles.

The question I have is why should DOD contract out with France when you have qualified U.S. producers that could undertake that work? Why, when our own industrial base is underutilized, would we go to a foreign source for a material or technology which would further dilute the U.S. production base?

I would also like to discuss briefly an issue I raised at the last hearing regarding the certificate of competency. The Small Business Administration has the power to overrule a contracting officer who determined that a small business should not be awarded a contract. I am familiar with one case where a Navy contracting officer had issued a nonresponsibility determination because the low bidder had a record of poor performance over eight previous contracts. The contractor then went to the SBA and got a certificate of competency which overruled the contracting officer. In a letter to DOD, I asked whether the Department recommended changes in the certificate of competency program. DOD's response was "No."

When I asked whether DOD believed the COC program should be abolished, the response was the same—"No." I don't understand why, if you have 20 to 25 percent of contractors receiving COC's not completing the requirements of the contract, DOD would not even make a recommendation for improving the COC programs.

Mr. **Carlucci**. That particular program is one we will be reviewing in the context of the overall review that is underway now to look at the mass of regulations and statutes that impact on our procurement process.

You point up a fundamental dilemma. I am before this committee because I am presumably accountable for the acquisition process in the Department of Defense, yet you may well have statutes that give some authority and responsibility to somebody in another agency.

Indeed, that is a very fundamental question that I understand this committee may well be debating in the near future.

I would urge that we put the authority and the accountability in the same place. In my judgment, that is one of the biggest failings of Government, that is to hold a secretary of a particular department accountable when he does not have the authority within his department. I would hesitate at this point to make a specific recommendation on that particular program, Senator Cohen, but I would be glad to get back to you with analysis of the problem that you mention and make some recommendations.

[The information referred to follows:]

The Small Business Administration (SBA) has statutory authority to certify the competency of any small business concern as to its responsibility to perform. If a bid or proposal of a small business concern is to be rejected because the contracting officer has determined the firm to be nonresponsible, the matter is referred to SBA. SBA may, upon review, determine the firm to be responsible and issue a Certificate of Competency (COC). This certificate is conclusive of the contractor's responsibility, unless appealed through higher management levels, which entails further review and takes additional time—a course of action that is seldom taken.

In fiscal year 1980 there were 1,582 COC referrals to SBA. SBA issued 346 COC's. Our past experience indicates that about 20 percent of the small business concerns awarded contracts based on a COC will result in unsatisfactory performance.

In connection with our initiative to examine the burdensome affect of government legislation on the acquisition procesc, this matter was thoroughly reviewed. While some procuring activities support a revision in the procedure, there is a strong feeling in the small business community that the procedure protects them from arbitrary and capricious decisions of contracting officers. Also, you will note that SBA supports the initial decision of the contracting officer in approximately 80 percent of the COC referrals.

Considering these factors, we concluded, on balance, that the current procedure is acceptable.

Senator **Cohen**. One of the recommendations you have made in your April 30 memorandum is to go to multiyear procurement. I know a number of editorials have supported you and it has general support, I think, in the Congress. However, there are some lingering memories about what multiyear procurement has produced in the past. What kind of safeguards would you recommend in going to multiyear procurement so you don't run into the situation you had back in the early 1970's.

Mr. **Carlucci**. We are very much aware of the need to proceed cautiously on multiyear procurement. We are going through a careful program analysis. We are choosing our most mature programs and our most stable programs, and we are presenting these programs to Congress during the funding process so Congress will have an opportunity to review all of them.

As I indicated in my earlier remarks, we have designated four programs, troposcatter radio program, the C-2 aircraft, the F-16 aircraft, and the Black Hawk helicopter.

Senator COHEN. Right now the DOD cost estimates at the planning and development stages are subject to independent evaluation, and yet the interim cost estimates are still underestimated on an average by 100 percent in the planning stage, and by 50 percent in the development stage.

The question I have is how can the cost analysis improvement group within DOD be used more effectively to induce program managers to more accurately estimate their cost?

The issues are how do we get realistic cost assessments, of what point in time should DOD make the estimates, and should Congress have access to all estimates. Perhaps you can make some recommendations as to what role the CAIG should serve, and also how Congress could attain greater access to the range of estimates made at the planning and development stages.

Mr. CARLUCCI. You put your finger on a very fundamental problem because a large part of the cost escalation is really under estimation in the first place and there has been a tendency, as you pointed out in your opening remarks, on the part, not just of contractors, but also on the part of program managers to buy into their program, into the budget on the assumption that they can leverage it up in later years and make themselves whole.

The CAIG serves as an advisory group to the DSARC, Defense Systems Acquisition Review Council, and provides that committee with its best judgment on costs as the programs come up for their various milestone reviews.

One of the problems in the past is the DSARC process has not been integrated with the budget process. As we modify the DSARC process in our 32 acquisition points, we merged milestone 1 with the budget process so we could get a better handle on the figures.

There is a fundamental dilemma in having outside groups make the cost estimate. Supposing program manager A comes in with an estimate of $100 million for a particular program and somebody else looks at it, the CAIG or the Congress or the Defense Resources Board and says, "Well, we think it ought to be $150 million."

First of all, do we have better grounds for making that estimate and, second, if we put that estimate in, it tends to be a self-fulfilling prophecy. That program manager is then going to spend $150 million. So you are caught on the horns of a dilemma. The most sensible way to deal with this, in my judgment, is to intensify our review.

We have put out, as one of our 32 points, a directive stating, "You must budget to realistic costs and to evalute program managers' performance by that standard to conduct reviews in DOD all the way up the line and to try and get realistic costs in the budget."

As for the role Congress can play in this, it seems to me it is a fundamental responsibility of the Secretary of Defense to present the programs to the Congress in the budget and the Congress can then review the costs in the budget to see if we have made the best estimate. We would welcome any independent evaluation you may wish to make.

Senator Cohen. Thank you, Mr. Chairman.

Chairman Roth. Senator Mattingly?

Senator Mattingly. I won't keep you very long.

We have talked before. I think we have a problem right now in Defense and in this budget process concerning our attempts to increase our defense capability and at the same time control costs.

I guess where I am heading is G on your chart back there, "Estimating and Other." Let me ask you one question.

Mr. Woolsey is going to make a comment soon that says:

> Career civilian managers are an important part of the acquisition system. Frequently they provide the institutional memory in contract administration offices, in laboratories and elsewhere in the process as the military officers rotate through. These career acquisition managers provide an important element of seasoned judgment about such matters—which can never be derived from fixed formulae—as the best type of contract for a given procurement, or whether the state of technology will permit more or less concurrency in a weapon development.

Do you agree with that, that they have an invaluable institutional memory?

Mr. Carlucci. Yes, I certainly agree with that.

Senator Mattingly. Do you agree they can make or break any weapons system acquisition?

Mr. Carlucci. That might be a bit of an overstatement. We depend very heavily on the program managers and on the civilians who monitor the acquisition process.

Senator Mattingly. He goes on to say:

> The civilian pay cap leaves the best of them no hope of financial advancement and assures them that inflation will continue to cut their salaries, undermine their hopes of better higher education for the children, and the rest. In my judgment it is the single remaining most negative and destructive government policy standing in the way of effective reform of the defense acquisition.

Mr. Carlucci. Yes, I think it is a very serious problem. I think the exodus of talent from the Federal Government is one of the most serious problems we face.

Senator Mattingly. In the context of the management mandate you and I talked about, do you think the Defense Department can be managed?

Mr. Carlucci. Certainly, I think the Defense Department can be managed. I don't think manageability is a function of size. I think it is a function of putting the authority where the accountability is—the problem I addressed earlier—and unfortunately that does not always happen in government.

Senator Mattingly. Which gets down to, I guess, the sublevels of the management—I am not talking about you or Secretary Weinberger. What we are all trying to get at is getting a product for the right cost. This is what this is all about. It seems to me that G is what we are looking at, that G is where we are not getting the correct figures from whoever the management is down in the Defense Department lower levels of management.

What is the structure required to get a correct estimate as you would if you were in the private sector from the DOD, from that subterranean group that you are trying to control?

Mr. CARLUCCI. I think what is required, and I think you have put your finger on the principal problem because that is where a lot of the real cost escalation, as opposed to the economic cost escalation comes. We have to motivate our people better. They have to understand what the rules of the game are. We have tried to do that through our 32 points. They have to understand that they are responsible and will be held accountable and we have tried to do that in our 32 points by putting emphasis on the program manager.

They have to be unburdened from the excessive paperwork. We found, for example, to go through one DSARC milestone, a program manager had to give up to 90 briefings. They must be allowed to do their work and not spend all their time briefing senior officials, and they must have access to their superiors and, if necessary, to the very top level of defense management.

They must, above all, understand that the country has confidence in them; that they serve a very vital purpose and that the Congress and the top officials of the administration will support them as they do their job.

And finally, we need to select the most competent people and where they are not competent, we need to move them. That is not always easy under the civil service regulations, as you know.

Senator MATTINGLY. I am working on the project of moving the incompetents. Do you think that can be accomplished within a reasonable length of time? People working in the Department of Defense have the same problem as the people working at a papermill in Brunswick, Ga., in trying to fight inflation. Do you think the change, the direction, the motivation, whatever it is, to accomplish proper estimations from those people, can be accomplished within a reasonable length of time while reducing some of the unnecessary burden of paperwork?

Mr. CARLUCCI. I think the measures that I have laid out can improve the situation. I think we can get that figure down. I don't want to pretend we will always have failure-proof estimating. In any business, as you know, and in any Government agency, there are going to be misestimates when you start in on a weapons system.

Senator MATTINGLY. But it is easier for somebody in a business to accomplish a change than it is for you to accomplish a change in the Defense Department.

Mr. CARLUCCI. It is indeed.

Senator MATTINGLY. And those items you have laid out over the last few month—and I feel sorry for you having to testify all the time—what length of time are you looking for to have some of these things go into effect? Can we really expect them within a reasonable length of time, knowing the structure of the Congress or are there things——

Mr. CARLUCCI. Let me tell you what the principal problem is, Senator Mattingly, in my judgment. It is faith that we are going to succeed. I have testified before some four or five different committees on this subject, and I have heard all kinds of prophecies of failures. I have heard, your predecessors tried this and failed. Why do you think you are any better? As if we shouldn't try. So the program managers are looking at this whole thing somewhat skeptically at this point. I think they are convinced that Secretary Weinberger and I are dedicated. They are not fully convinced that the structure all the way down is dedicated, and they need to be convinced that the Congress supports the principles that we have laid out. Once that happens, then you are going to get a complete change in attitude, you are going to get a complete change in the reward system.

And while money is important, and I agree with Jim Woolsey, that inadequate compensation is a concern, the psychic rewards are also important and if they feel they are doing the right thing and that they are in tune with the top leadership of the administration and the Congress, then I think you will get that figure down.

Senator MATTINGLY. I would think if we solved the G problem on your chart, the American public woudn't mind compensating people better in the Government.

Mr. CARLUCCI. I would agree, the money saved could be used to compensate the people adequately.

Senator MATTINGLY. That is all I have.

Chairman ROTH. Senator Rudman?

Senator RUDMAN. Thank you, Mr. Chairman.

Mr. Carlucci, as we look at your chart that is there, of course, the big number is under program change, roughly 50-51 percent. In hearings we had here last week, I spoke to some of the witnesses about three points which come right within your category D. I would like to discuss them with you just for a moment this morning.

I think there are clearly three areas which anyone who you talk to who has had experience in the Defense Department will address as being the major causes, other than inflation, of the kind of horror stories we saw this year on the Defense Appropriations Committee in terms of cost growth in about 30 major systems. First, that which you addressed in your testimony of, particularly in the R. & D. area, unrealistic estimates at the very outset in order to—to use your term—buy in with hopes of bailing out in the future.

In other words, giving Congress, to use a polite term, misleading testimony about what costs are. I would not use the words "deliberately misleading," but it certainly is misleading because I think the people certainly had some understanding that, within the Department of Defense and defense industry, these R. & D. cost estimates were low.

Second, the inability, it seems, of the Congress to get information in terms of cost progression within the R. & D. area.

Let me be specific about that. We have testimony and information which indicates that in many cases 70 to 80 percent of the money has been expended and in any milestone evaluation anywhere from 10 to 20 to 30 percent of the work has been completed, the Congress not really understanding that particular event happening.

And third, and this, I think, is probably one of the most difficult to quantify in any way, the desire of the Defense Department and it is a proper desire to get the very best, to push the state of the art to the limit and to get that last increment of specification, that last 4 or 5 percent which in some cases has been responsible for an inordinate amount of costs, not only in R. & D., but in eventual production.

What are you doing about those three things? If we don't address those three things, we are not going to address the program. With all due respect to the people and with all due respect to your initiatives, it seems if we are going to learn by history, those three areas are something we have to do something about if we are going to succeed.

Mr. Carlucci. I appreciate that those are areas of real concern. Let me emphasize, Senator Rudman, B is not just program change. B is the inflation component of program change.

Senator Rudman. I understand.

Mr. Carlucci. In terms of unrealistic estimates, you will note that one of our 32 points is directed at that problem in enjoining our program managers to budget the most realistic budget cost.

We do have the DSARC reviews and the CAIG process that Senator Cohen referred to. I have this year for the first time asked one of the staff officers in OSD to make an independent review of the cost estimates for the Defense Resources Board process, the group that decides on the budget figures.

Senator Rudman. Will that be prospective in nature or retrospective?

Mr. Carlucci. It will be prospective in nature. We will give Congress, I can assure you, the best estimates that the Secretary and I can come up with.

Obviously, with the vast number of weapons systems we can't get down into the details of each system, and we have to depend on our management all the way up the line to give us the best estimate, but we are trying to stimulate management to do just that.

On cost progression information, my understanding is that the Defense Department over the course of the years has tried to interest Congress in the SAR's, the selected acquisition reports, to get them to suggest changes that might be made to make this reporting system more meaningful to Congress.

We would be delighted to have your suggestions. I acknowledge that the SAR's are very difficult to read. I have urged that they be simplified, but if Congress can define for us what kind of reporting it truly needs, we will be glad to do it. I don't know whether that has to be done by statute. I am willing to do it within the existing management system.

As far as a desire to get the best is concerned, let me make one philosophical comment, and then I agree with you. When we look at the production figures and the numbers of weapons produced by the Soviet Union, we have to realize that our deterrence is based on a quality edge and there has been a lot of criticism of sophisticated systems, as if the word "sophisticated" is synonymous with unreliable. We believe we have an obligation to our people who may be called upon to fight to give them the best possible weapon system, and we think we have to maintain our technological edge unless we, of course, want to go to numerical superiority, which I believe is not feasible from the budget standpoint.

But there is a tendency to try and get perfection out of our systems, no question. And you will note that both in the philosophical statements at the outset of the 32-point memorandum and in one of the points, we address this particular problem. We enjoin the services to use an evolutionary approach to weapons systems development and one of the points establishes a preplanned product improvement program.

We have put a memo out to the services calling for them to designate P^{3}I programs. They have come back with 30 or 40 programs. We are in the process of reviewing those programs to see if we can go into those programs with a deliberately planned evolutionary approach. We think by doing this can discourage that effort to get the last piece of technology into every system.

Senator RUDMAN. In terms of product improvement, I understand that. In terms of new systems, how much are you using the Science Advisory Board to look at some of the specifications that are set forth in new systems and make determinations as to whether or not what is being asked for in technological innovations in some of these systems may not end up in the kind of problem we have in the cost growth?

We don't have to talk about which ones but there are some very bad stories this past year.

Mr. CARLUCCI. We don't use the Defense Science Advisory Board as an acquisition review mechanism. We ask them to look at broad problems. Where you have systems that may well be on the edge of space technology, space lasers, et cetera, we do ask them to give us their best judgment of the feasibility of their systems, their vulnerability, their capabilities, so we do use them.

Senator RUDMAN. Do you believe it would be useful historically to have some of your systems people take a look retrospectively at these three points I have raised that we have discussed here this morning—I asked the Congressional Budget Office and the GAO the same question. The Defense Department is the best source for that. Do you think it would be helpful in terms of where we have gone wrong?

Mr. CARLUCCI. I will be glad to look at that, Senator.

Senator RUDMAN. I know it will take some time but I think it would be worthwhile, rather than look at charts, to get down to hard facts——

Mr. CARLUCCI. I don't want to divert too many resources, but I think we can profit by the lessons of history.

Senator RUDMAN. If you can figure out those SAR's maybe you can use it as a base. This morning's Washington Post mentions that the amendment sponsored by Senators Nunn, Stennis, Mattingly, and myself is being actively opposed over in the House, a report which I believe to be accurate based on personal knowledge and information. You know, Mr. Carlucci, I get the very uneasy feeling sometimes up here that we are involved in an almost adversary proceeding, not particularly from you, but I do get that feeling from time to time, particularly in defense appropriations. Why would the Defense Department want to oppose this report which, frankly, was intended by the sponsors to at least give some indication to the American public that the Congress will not find out a year later that something has tripled or quadrupled in cost.

I can understand your saying to me, and you said it rather subtly a few moments ago, that you would rather do it by management system than by statute. What is wrong with the statute and are you opposed to it?

Mr. CARLUCCI. Let me emphasize when this proposal first came up, I talked personally to Senator Nunn and indicated we were not opposed to a reporting system and that we would be glad to work with the Congress to develop a workable reporting system. That continues to be our position, but we do have a number of technical problems with the Nunn amendment that we would like to work out with the Congress and hopefully we can do this in conference.

If you like, I can go over those.

Senator RUDMAN. I don't think we need do that today, but I would like to talk to you about them—my time is up, Mr. Chairman. I have a brief comment. It seems to me and to those of us who agree with you, that those numbers in those charts indicate we have serious problems. When the President of France, Mr. Mitterrand, agrees with the strategic evaluation of our President, then we all have problems around here. We are not going to solve them unless the American public, which is a very fragile consensus for defense right now, thinks we are doing all we can to hold down costs. That is why the chairman is holding these hearings.

I think they are valuable from that point of view.

Mr. CARLUCCI. I agree with you, Senator Rudman.

Chairman ROTH. Senator Pryor.

Senator PRYOR. Mr. Carlucci, I would like to discuss, for a moment, competition in your 32-point memorandum. On October 2, President Reagan announced his decision to proceed with the production of 100 B-1 bombers for which the Rockwell Corp. is to be the prime contractor. That, by the way, is the same contractor, I think, that handled the construction of the Space Shuttle and it had a $965 million cost overrun.

On October 23 in Aerospace Daily, and I have a copy of it here, it was reported that Rockwell is ready to go on production—this was just a few days after the Presidential decision—and, in fact, the spokesman for Rockwell said he had received fixed or firm price proposals from 37 of the 39 subcontractors that Rockwell was going to use on the B-1 bomber. Nine months before the decision had even been announced, a Denver reporter reported on a Colorado firm which had been contacted by Rockwell regarding 100 of a particular B-1 component which Rockwell intended to subcontract for with this particular firm.

[The article referred to follows:]

[From the Aerospace Daily, Oct. 23, 1981]

ROCKWELL'S SUBCONTRACTOR TEAM READY FOR B-1B, HELLO SAYS

Rockwell International has fixed price proposals from all but two of the 39 subcontractors that will aid it in building the B-1B bomber, according to Bastian (Buz) Hello, president of the company's North American Aircraft Operations.

Hello told reporters Wednesday in Arlington, Va., that each of the two—Kelsey Hayes of Springfield, Ohio, which would supply the rotary launcher drive mechanism, and McDonnell Douglas of Long Beach, Calif., the ejection seat supplier—"has a special reason" for its position. Rockwell does have cost-type contract proposals from Kelsey Hayes and McDonnell Douglas, Hello said. He also said, "The Air Force has extracted from us (Rockwell) a fixed price contract." But, he said, "The technical risk is low."

Vought Corp., a member of the Northrop team which will build the Advanced Technology, or Stealth Bomber (Daily, Oct. 19), is also a Rockwell subcontractor, slated to supply aft and aft intermediate fuselages. Hello, asked after his press conference if Rockwell might use some of Vought's stealth technology, said, "Stealth is a highly classified program and transfer of information concerning it would be through normal Air Force channels."

TO BUILD IN FOUR LOCATIONS

An Air Force spokesman said the AF is always open to improvements and if, through the course of a development program on one system it could see the possibility of benefitting another, it would do so. If such a process would involve contract negotiations, they would be carried out through the Air Force, he said.

Vought refused to comment, saying all details of its work on the Advanced Technology Bomber are classified.

General Electric, which will supply the B-1B's F-101 engines, is also on Northrop's Stealth bomber team, and Hello was asked if this could help lower the cost of the propulsion part of the B-1B program. "It could," said Hello, "but I'm not privy to the numbers. GE's contract is directly with the Air Force and not with us. Obviously, if the engines are produced in quantity the cost would be less—if it's the same engine."

Hello discounted reports that Rockwell's subcontractor team wasn't ready to proceed with the project. "Our team is very much intact," he said. In a statement released to reporters, Hello said that "Without exception" the subcontractors "told me they welcome the challenge and, more importantly, that they have the capabilities and manpower to meet our expected requirements."

Rockwell would build the B-1B in four locations, Hello said—El Segundo, Calif.; Columbus, Ohio; Palmdale, Calif., and Tulsa, Okla. Flight test and checkout would take place at Palmdale, where the company plans to construct an 800,000-square foot plant. Some 7,000 people are now on hand to participate in the program, and a total of 26,200 is needed. There would be 8,500 at El Segundo, 7,500 at Columbus, 4,200 at Palmdale and 2,000 at Tulsa, Hello said. "We had four labor markets—no longer only one to draw from."

Hello said Rockwell plans to hire a lot of people in a hurry and asked rhetorically, "can we make it?" The answer, he said, is "yes," because, before President Reagan's Oct. 2 announcement recommending a go-ahead—Congress still has to approve—"we had 14,000 applications on hand, and 43,000 have come in since, for a total of 57,000 applications. Of the 14,000, 40 percent are professionals and 60 percent have general skills." Overall, "42 percent of the 14,000 are viable." Of the 43,000 new applicants, only 2 percent have professional skills with 98 percent having general skills, Hello said. "Twenty-six percent are viable" for hiring, he said.

Asked about funding, Hello said he was "optimistic * * * hopeful." On the other hand, "It's not going to be an easy walk * * *. Am I optimistic? Yes. Am I wildly optimistic? No * * *. The gray hair entitles me to something. I've seen these things come and go. I'm certainly not sanguine, but I feel reasonably certain" that the Air Force will successfully explain the B-1B to Congress, and that it will approve.

Senator **Pryor**. This to me smacks of going directly contrary to your proposal for competition. How can we be led to believe that Rockwell is using a competitive bid procedure with its subcontract force if only 3 weeks after the Presidential decision is announced they already have their bids?

Mr. **Carlucci**. You have lumped together, Senator Pryor, a number of problems and issues. You were presumably referring to leaks about Presidential decisions that might have taken place before those decisions were made. There were some leaks, some accurate, some inaccurate. The press has been generally bemoaning the inaccuracy of certain leaks on the MX. We took every precaution to keep the decision process only to those who needed to know. Indeed we are being criticized for having held the decisions too closely.

There was certainly no authorized leak of information to Rockwell or anybody else in advance of the B-1 decision. If Rockwell chose to go ahead and make some investments or put out some RFP's, that was done on their sole responsibility and had the President not decided for the B-1, they would have presumably been financially liable.

In a sense, the B-1 is being competed. It was competed, as you know, at the outset. Rockwell won the competition for the airframe, G.E. for the engine, and Boeing for the avionics integration. But over and above the number 100, it is going to be competed against the advance technology bomber because we are preserving our options. At the same time in this sense we are competing the advance technology bomber by this decision. There are some who argue we ought to go immediately to the advance technology bomber, but by having the B-1 in production, we preserve that option and put pressure on the company producing the advance technology bomber. So, there is an element of competition.

Senator PRYOR. Mr. Carlucci, 37 of the 39 subcontractors that are going to be utilized in this project evidently had their bids in or the price was already prearranged. Do you support that conclusion?

Mr. CARLUCCI. As a factual statement, I don't know if that is right or wrong. I will be glad to submit something for the record on it. If Rockwell did that, they did it on their own responsibility.

[The information referred to follows:]

THE DEPUTY SECRETARY OF DEFENSE,
Washington, D.C., November 20, 1981.

Hon. DAVID PRYOR,
U.S. Senate,
Washington, D.C.

DEAR SENATOR: During my recent testimony you asked about the use of competition in the B-1 program at both the prime and subcontractor levels. I would like to explain the current status of this aspect of the B-1 program.

The original B-1 program was competitive, of course, and Rockwell was selected as the winner. Rockwell had essentially completed the development program and was about to enter production when the program was terminated by President Carter. Rockwell was to be the only aircraft producer because we were not planning to buy a sufficiently large quantity of planes to justify having a competitor for the production phase. Competition was employed in selecting most of the original subcontractors as well.

Initial Full Scale Engineering Development contracts were released to Rockwell and the other B-1 primes (GE-Engine, Boeing-Avionics Integration, AIL-Defensive Avionics) in May 1981 using part of the $300M of fiscal year 1981 funds authorized for the multirole bomber. These contracts do not permit full scale engineering development or production. Rockwell is essentially on a sustaining engineering basis and is authorized to only perform those tasks leading to a contract after fiscal year 1982 funds are released. This task consists primarily of updating the configuration and drawings. To recompete on a "build to print" program would involve at least a 2-year delay. Any savings from such a competition would be negated by the large program slip, and no other contractor could reasonably be expected to match Rockwell's costs because of the experience it has gained during the original B-1 development program

As part of the sustaining effort Rockwell is authorized to task its B-1 subcontractors to perform the same type of work. The subcontractors have been authorized to update configuration and drawings at contract values in the low thousands of dollars. No subcontracts for either engineering development or production were released prior to DOD announcement and they will not be released until the bomber program is fully authorized.

The majority of the sustaining B-1 subcontracts were placed with the winners of the original competition for the B-1 program. Rockwell will, however, be competing some major subcontracts that are not schedule-critical, such as the multimode radar, horizontal stabilizer, vertical stabilizer, and aft intermediate fuselage. To compete all subcontractors would essentially be a restart and delays of over 2 years would be anticipated.

Please let me know if we can provide any further information to you on the B-1 program.

Sincerely,

Frank C. Carlucci.

Senator Pryor. If they already have 37 of the 39 subcontractors who have placed their bid or given them the price on the different components for the B-1, have you seen those bids or those proposals, or do you know the cost when you add the 37 of the 39 together?

Mr. Carlucci. I have not personally. I don't know if anybody here has. It is being handled by the Air Force, but I would be glad to get you some information on it.

[The information referred to follows:]

B-1B Subcontractor Proposals

The October 23, 1981 Aerospace Daily, that you referenced earlier, reported on statements by a Rockwell International official that Rockwell had fixed price proposals from all of their 39 largest subcontractors except for Kelsey Hayes and McDonnell Douglas. Since that time we have learned that the McDonnell Douglas ejection seat will probably be procured as Government Furnished Property (GFP) but that another subcontractor, Air Research, is also not submitting fixed price proposals to Rockwell.

On a dollar basis Rockwell intends to make 45.1 percent of its portion of the B-1B and to buy the remaining 54.9 percent from subcontractors. The 39 largest subcontractors mentioned account for approximately 50 percent, with the remaining 4.9 percent allocated to nearly 3,000 other subcontractors. The total dollar value of all 39 major subcontractors for Full Scale Development (FSD) and production lots 1 and 2 is $5.5B. The total dollar value of the 37 major subcontractors submitting fixed price proposals to Rockwell for FSD and lots 1 and 2 is $5.46B.

Senator Pryor. It is just my basic feeling that subcontractors are not being included in the competitive bid procedure and this result is contrary to your particular proposal.

Mr. Carlucci. If what you say is correct, it is a matter of concern and we will look into it.

Senator Pryor. And inasmuch as today we have no incentive for a contractor to come in within the original bid, I could say the cost growth we are going to see is going to be found in the subcontractors' proposals and their cost overruns. You add all those contracts up and I think that is where we have so much of our overruns. That is just a personal opinion.

Since 1977, when President Carter basically scrapped the B-1, how much have we spent on the development of the B-1 bomber?

Mr. Carlucci. Subject to correction in the record, I think the figure is in the neighborhood of $2½ billion.

Senator Pryor. $2½ billion?

Mr. Carlucci. That is the total R. & D. bill.

Senator Pryor. Was the original purpose or mission "to provide manned penetrating bomber capability"?

Mr. Carlucci. That mission plus a conventional role. When the plan was originally conceived back in 1972, I really can't speak to that.

Senator Pryor. If I am not mistaken and my facts may not be totally accurate, I think that is a correct assumption. And, two, I think since 1977, we have also seen the B-1 expanded to include other missions. One, ability to operate as a cruise missile platform. Two, ability to operate as a conventional bomber, three, naval warfare capability, including the ability to lay mines and, four, as a force projection.

This is in addition to the original capability of the B-1. Do we have actually or have we ever had a mission needs statement for the B-1 bomber?

Mr. CARLUCCI. No, we have not had a mission needs statement as such.

Senator PRYOR. Ever?

Mr. CARLUCCI. Because it was terminated before it went into production.

Senator PRYOR. You mean before we even started the expenditure of billions of dollars we didn't know why we were building the B-1?

Mr. CARLUCCI. As you know, I was not around at that point, Senator Pryor, but I am informed that was done under an Air Force requirements system and that we did not have the mission element needs statement in place at that point in time.

Senator PRYOR. So we still to this day have no mission needs statement to justify the B-1 bomber and its purpose?

Mr. CARLUCCI. We may not have a formal piece of paper, Senator Pryor, but any number of people in the Defense Department have gone over the mission of the B-1, including extensive briefings to the Secretary and myself on the mission and the need for the B-1. We spent an enormous number of hours on this subject.

Senator PRYOR. But doesn't it appear that each year that the B-1 is sitting out there waiting to be built we add a new mission to it? It looks like we have four new missions since its original inception.

Mr. CARLUCCI. It may well be.

Senator PRYOR. Since 1977?

Mr. CARLUCCI. It may well be because requirements change and certainly the nature of the threat changes. Cruise missiles have been developed since that airplane was originally conceived. So I think it is entirely appropriate to add missions as you go along. Our responsibility was to look at the total mission need as it was defined by the nature of the threat and to weigh whether the B-1 was the best weapons system to meet that need.

The President decided that it was.

Senator PRYOR. Earlier this year, and I think the record ought to show this, Rockwell estimated that 100 B-1's would cost $11.9 billion or $119 million per plane. The Deputy Air Force Chief of Staff said in March 1981, and I quote, "Our confidence in these figures obtained from the contractors is not high." In May of this year, the Air Force estimated the program will cost $15 to $18 billion.

The Pentagon officials told the House Appropriations Defense Subcommittee recently that the program would cost $19.7 billion. Now the President has announced his decision to build the B-1. We now have estimates ranging from $20 to $30 billion.

Isn't this a classic case of a buy-in on the B-1 bomber?

Mr. CARLUCCI. I don't think so. First of all the figures you cited are at different points in time, so you have to take into account inflation. Second, I think you pointed to a problem that is created when people try to get cost estimates before the administrative branch of Government has been able to develop them fully.

Senator PRYOR. I don't think the inflation rate is 100 percent since January or February of 1981 when some of these cost estimates were coming in.

Mr. CARLUCCI. Those were not firm estimates at that time. We were in the process then of getting firm estimates. I would be glad to submit something to you on each of those estimates. I can't talk about them off the top of my head.

[Information submitted by Mr. Carlucci follows:]

The Rockwell estimate of $11.9B in fiscal year 1981 constant dollars, which first appeared in the fall of 1980, was a rough estimate of the cost of 100 very austere B-1A aircraft, not the much improved B-1B configuration. Moreover, this estimate did not fully reflect such major program cost elements as research and development, avionics and logistics requirements.

A preliminary Air Force cost estimate for 100 aircraft with a configuration similar to the B-1B was available in early 1981. At that time, the cost of 100 B-1Bs was estimated to be $17.2-18B. This estimate was raised to $21.2B after the submission of contractor cost data and revised estimates of logistics requirements. Cost savings resulting from multiyear procurement and tight control of engineering change orders subsequently reduced this estimate to $19.7B in fiscal year 1981 constant dollars.

The President's decision to include a cruise missile carriage capability in the B-1B configuration resulted in an increase of $.8B in the program cost, bringing the total cost to $20.5B in fiscal year 1981 constant dollars. This figure is the official DOD estimate, and we have taken a number of management steps to ensure that the B-1B is delivered within the budgeted cost.

The evolution of B-1 cost estimates is typical of the confusion that can result when preliminary estimates are seized upon before the DOD is able to develop them fully. In addition, a considerable amount of confusion can result when estimates are quoted without specifying the inflation assumption used. For example, the $20.5B estimate in constant fiscal year 1981 dollars equates to about $28B when OMB's outyear inflation indices are included.

Senator PRYOR. Mr. Carlucci, my time is up. I am sorry.

Chairman ROTH. Senator Sasser.

Senator SASSER. Thank you, Mr. Chairman.

Mr. Secretary, you indicated a moment ago that we do strive for a quality advantage in our weapons systems to offset what many times is a quantitative disadvantage. Former Navy Secretary Woolsey, in his testimony which I think he will deliver later today, notes that the Soviet procurement system is putting into place some very sophisticated weapons systems. He says in his testimony that, "The military sector is about the only sector of their economy that is technologically advanced, but is no less capable for that." He goes ahead to cite, "It is certainly no producer of primitive equipment." He says, "The Soviet Navy is procuring nuclear-powered surface ships," and we know they are, "extremely capable sea-based air defense systems, air-cushioned vehicles for naval infantry assault, fast titanium hulled submarines" that he says we simply cannot afford to build.

They have an M-1 type tank that has been successfully deployed for some years and they deployed it at a fairly rapid pace.

In short, it appears that the Soviet Union is procuring and deploying sophisticated and reliable weapons at a rapid pace. Now my question is twofold.

Can you provide us with a comparative estimate of the time that it takes the United States and the Soviet Union to procure a comparative weapon system that is sophisticated? Let's take the M-1 tank, for example. We are still struggling with that program. What is our timeframe there in comparison to the time it took them to put their M-1-type tank into the field?

Mr. **Carlucci**. I would certainly say our cycle in that case was longer. Subject to the necessary protection of intelligence information, I would be prepared to give you our best estimates. My impression is, when we get into the procurement process, the timeframe is about the same between the United States and the Soviet Union, but in the R. & D. process, they can produce weapons substantially faster than we can.

I enumerated before you came in, Senator Sasser, some of the reasons I saw for that.

[The information referred to follows:]

The M1 tank program was formally approved by Secretary of Defense in January 1973. Chrysler Corporation was awarded the contract to begin building Full Scale Engineering Development tanks in November 1976. The first production tank was delivered in February 1980, seven years after the M1 tank program started.

Current thinking within the Intelligence Community is that the Soviet's development times are no shorter than those for the US. The development time span for the T-64 was [—] years and [—] years for the T-72.

The Soviet's great advantage arises from the continuity of their process, not necessarily the efficiency of it. Within their process, once a decision is made to fund a given system, no further justifications are necessary. Annual fund allocations are made automatically to keep the development on schedule. The originating design team stays with the system throughout its life instituting changes and product improvements as necessary and required. Finally, while development times are generally comparable, the Soviets follow a policy of early design freeze and initiation of a follow-on system design thus allowing them to be continually fielding new systems which may give the inaccurate appearance of a shorter development cycle.

Senator **Sasser**. Mr. Secretary, I will read your testimony with great interest—when it is transcribed—on that particular point, but at the risk of being repititious, are there two or three key policies that we can adopt that will speed up the procurement process but at the same time keep our procurement choices in line with what they ought to be?

Mr. **Carlucci**. There are two key policies that can greatly speed up the procurement process. One is stability. The greatest problem we face in the Defense Department is the start-and-stop syndrome, the stretchout, the budget process, and the second is adequate funding for weapons systems, and we have tried to address that here. It is more than just a question of estimating. It is a question of making some of the hard decisions because as I indicated earlier, there are too many weapons systems in the Defense Department budget and we are just going to have to kill some of them to make sure the others are funded at economical rates and at rates that allow them to be fielded in a ready state. That is another particular problem that we have had to face. So those are the two most fundamental principles. The other things we are doing fall under those.

Senator **Sasser**. Mr. Secretary, Dr. Alice Rivlin told the committee that the Congressional Budget Office has developed deflators for use by the Department of Defense that would more accurately predict the cost of high technology weapons systems. She acknowledges these CBO deflators would probably result in higher estimates, but they would be more accurate.

I get the impression on occasion that we in the Congress are almost like automobile buyers used to be down in my State. There was a Ford agency there called Hull-Dobbs Ford in Memphis, Tenn. They came up with a system of selling automobiles that became famous all over the country. It was called the Hull-Dobbs plan. The farmers would come up from Mississippi to Memphis, or come down from Senator Pryor's Arkansas, to buy their Model A Fords, and, later on, the first V-8 Fords, when they came out. And Hull-Dobbs would put this plan into effect, called the high ball/low ball plan. The farmer would come in. He was a pretty good mule trader, but he didn't know much about automobiles, about the pricing of them, so the salesman would meet him at the door and put him on what they call the low ball. He was going to sell him an automobile at a certain price. The farmer thought that sounded good, but he needed to shop around some. So he would go to the other automobile dealerships. The other dealers would say, no, we can't match that price. So the farmer would come back to Hull-Dobbs and say, "I want to take you up on that." The guy would say, "I have to give that to the sales manager to get him to approve it." Of course, the sales manager put the farmer on what they call the high ball. The sales manager says, "No, we can't accept that, that price is too low. We will have to have more money." Well, by this time the farmer was running out of time, he had been there in Memphis about all day looking at these automobiles. He was ready to buy. So he would buy an automobile from Hull-Dobbs there and take it back home.

Sometimes I feel like we in the Congress are sort of like the farmer, that DOD or the admirals or generals would come over here and put us on a low ball and they will say, "Well, now, we can get this weapons system at such and such a price, and we will buy it." A few months or years later, the defense contractor comes back and he has us on the "high ball." He will say, "Well, now, we can't furnish that weapons system at that cost for a lot of reasons."

What I am getting at is: there must be a more accurate way of looking at these weapons systems and costing them out in the future. Dr. Rivlin with her deflators here, in my judgment, may have a way of doing that.

Would you comment on the DOD use of these CBO deflators for budgeting and contracting for weapons?

I personally feel that it is imperative that we in the Congress receive better information about the actual cost of defense systems in the programs as a basis for our decisions on how we go about this defense spending.

Mr. CARLUCCI. Senator Sasser, once again, you put your finger on a critical problem, and I agree there has been low balling—we call it buy-in—and I, as an executive in this Department, have much the same problem you do, I have to depend on my subordinates for cost estimates. I am trying to stimulate them to produce better cost estimates.

Of course, Ms. Rivlin is talking about the inflation component of cost escalation when she talks about the deflator. We, as you are aware, accept the OMB deflator. We are allowed to average it, that is to say, adjust different deflators for different weapons systems, depending on how we think that system will perform, but overall we have to correspond to the OMB deflator.

We think that is a reasonable position because we, most of all, have a stake in the President's economic program. This is not to say we do not have internal arguments with OMB over what the deflator ought to be. We are presently exploring with OMB the possibility of somewhat different approaches.

You will note one of the 32 acquisition initiatives is entitled "Budgeting for Inflation." I have sent a letter to Mr. Stockman proposing some alternatives. He is presently reviewing them and I would hope to hear from him shortly.

Senator SASSER. One final question, Mr. Secretary, because my time is about up.

In questioning the effectiveness of the weapons systems themselves, we all read the stories of ammunition that wouldn't explode in World War II, that sort of business. That brings me to the M-1 tank program. We have never, it appears to me, been able to develop a competitive tank. Our old Sherman tanks in World War II, although we produced them by the tens of thousands, couldn't match the German tanks and weren't comparable to the Russian T-32 tanks, again. We ran into those same T-32's in Korea. Our tanks weren't competitive there. There is some question now whether our old M-60A tanks have ever been competitive.

Now we are coming on with the M-1 and that is costing an awful lot of money and they say that operates pretty well in a dust-free environment—where tanks don't operate. Or if we have enough fuel to fuel it—what is it getting, 1, 2, 3 miles to the gallon?

I read the machine gun is situated in such a way that the tank commander cannot fire it without being some sort of a contortionist. This question bothers me. Why in the world can't we develop a first-rate tank in this country?

Mr. CARLUCCI. The M-1 is coming along and we are optimistic that it will meet all of our requirements. It is now undergoing extensive tests and I think we have reason to be optimistic.

Senator RUDMAN. Sir?

Mr. CARLUCCI. The answer to your basic question, why can't we develop an adequate tank, I think we will develop an adequate tank but it has been a long and excruciating process, there is no question about that.

We have to look at the totality of the problems that we face in the acquisition process, running from instability to the buy-in to the unwillingness to fund weapons systems for readiness, the unwillingness to put test equipment in. When we start putting pressure on the budget, that is the first thing that goes—spare parts, readiness, and test equipment.

Frequently we think we are saving money, but it ends up costing us in the long run. So what we have tried to do in the 32 points we have laid out is to turn that process around, saying to the program manager, "Budget for adequate readiness and sustainability, adequate testing at the outset, and we will stand up and support you."

When I say "we", I hope this will include the Congress as well.

Senator RUDMAN. Thank you, Mr. Secretary.

Chairman ROTH. Senator Levin.

Senator LEVIN. Thank you, Mr. Chairman.

Mr. Carlucci, I want to start off with some questions relative to competition.

Many people speak on that subject. Everybody is all in favor of it. Sixty percent of the DOD contracts are not competitively bid despite the fact that the GAO and others say we save from 10 to 25 percent on the average when we have competition. The regulations we have, I believe, are toothless. We provide for publication of noncompetitive contracts over $10,000 and yet there is such a short period for a potential competitor to get in an alternative proposal—it is only 10 days—that we find that few are able to do that. The appeal from a decision by the DOD in that regard which exists at the GAO is toothless because the DOD can ignore the fact the appeal is pending and go ahead and grant the contract and approve the contract anyway, which they do all the time.

We have a number of those that are currently under investigation by the GAO.

The GAO has estimated in one study that of 109 noncompetitive contracts they reviewed, 25 percent of them should have been awarded competitively. In another study, in 23 percent of the contracts reviewed relative to competition, the contracting officers did not even follow the procedures.

How do we get at that? You belatedly issued a recommendation, No. 32, I believe.

Your first 31 recommendations were issued in April or May and then a couple of months later you came and added a No. 32 recommendation.

It is too general for my taste. Maybe it will lead to something. Hopefully it will.

I agree it is a direction in which you ought to move.

In your July 27 recommendation No. 32, you told each military department of the Defense Agency having procurement authority to get their plans—their management objectives for the enhancement of competition plans—in within 60 days. How many of those have come in?

Mr. CARLUCCI. The Air Force has set specific targets. All the services have come in with plans.

Senator LEVIN. Would you share with us copies of those plans?

Mr. CARLUCCI. Certainly.

[The information referred to follows:]

DEPARTMENT OF THE AIR FORCE,
Washington, D.C., September 1, 1981.

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Subject: Increasing Competition in the Acquisition Process (Your memo, August 6, 1981)—Information Memorandum.

Attached is a list of initiatives that have been or will be taken to improve competition in the Air Force. Efforts are continuing to expand the initiatives. Air Force major commands have been asked to recommend objectives for improvement, and we expect to receive their ideas in September. Additional initiatives may be submitted after the command inputs are received and evaluated.

JAMES E. WILLIAMS, Jr.,
Deputy Assistant Secretary,
(Acquisition Management).

Attachment.

COMPETITION PROGRAM OBJECTIVES FOR THE AIR FORCE

1. Yearly Competition Goals.—The Air Force currently uses the goal-setting technique as a management tool to increase competition. Goals are expressed as percentages of obligated contract dollars which are to be awarded competitively. Goals are established by fiscal year for each major command and for the Air Force based on the results of the previous fiscal year, on the kinds of procurements expected to occur, and on an expectation of improvement in competitive performance. The Air Force's current objective is to achieve a competition level of 40 percent by the end of fiscal year 1984.

2. Improve Acquisition and Management of Engineering Data Used for Reprocurement Purposes.—The Air Force Audit Agency is examining the methods and techniques of acquiring and managing engineering data. Included in the scope of the audit are topics such as determination of data requirements, data inspection criteria, the management of data rights, and other aspects of data management which would impact our ability to establish a usable "reprocurement" data package. The purpose of the audit is to determine areas where improvements are needed.

3. Improve Public Perception of Competitive Performance.—Extensive Congressional and media criticism has been recently directed at DOD contracting, particularly at what is perceived to be an absence of "full and free" competition. We believe that there is a lack of understanding of the nature of competition in the DOD contracting environment and that the concentration of attention on competitive performance statistics may be a disservice to field-level managers. Performance statistics alone do not accurately portray the efforts that are expended to compete individual contracts.

We are preparing an article for public release which will explain the factors and circumstances which affect competition in the Air Force and which will explain our efforts to maximize competition.

We are expanding our competition statistics report (from the Procurement Management Reporting System, prescribed by DAR Section 21) to portray competition based on the number of contract actions. Currently, reports are based only on obligated dollars, which is the base used by Congress to measure our competitive performance. We believe that using both measures (dollars and actions) will give a more well-rounded portrayal of our efforts to maximize competition. For example, as of 30 June 1981 the Air Force had competitively awarded 36.7 percent of its dollars and 67.7 percent of its individual obligation actions. The second figure is needed to show that a larger number of actions are competed than not, while the first figure gives the impression that we award on a largely noncompetitive basis.

4. Continue Emphasis on Competition in the Purchase of Consulting and Other Management Support Services.—The Air Force intends to issue a new regulation which should substantially reduce the number of non-competitive consulting/management support services contracts. The new regulation would require: (1) use of a "sources sought" synopsis to publicize the requirement in advance with the intent to generate competition; and (2) that sole source justifications for such contracts be reviewed and approved by a General Officer or a Senior Executive.

5. Conduct Research to Determine How Competition Can Be Increased.—The Air Force's Business Research Management Center (BRMC) is planning research into centralized procurement procedures to determine how to remove impediments to competition, and to provide initiatives the Air Force can take to insure increased competition. This topic has been given the highest priority for fiscal year 1982 research projects.

6. Establish Field-Level Objectives Tailored to Specific Commands.—Major commands have been asked to recommend reasonable, attainable and demonstrable objectives for increasing competition. Recommendations and implementation plans will be considered by HQ USAF for inclusion with our established management objectives.

Department of the Army,
Office of the Assistant Secretary,
Washington, D.C., September 15, 1981.

MEMORANDUM FOR THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Subject: Increasing Competition in the Acquisition Process.
Reference your memorandum, subject as above, 6 August 1981.

The Army fully supports the DEPSECDEF's initiative, documented in his memorandum of 27 July 1981, for increasing competition in the acquisition process. Enhancement of competition produces many beneficial results and reinforces confidence in the integrity of the Government contracting system.

The Army has decentralized the responsibility for accomplishing its contracting function to commanders of activities with a significant or unique materiel acquisition mission. DOD policy on acquisition, with emphasis on competition, is promulgated by the Department of the Army to all contracting activities. With a continuing field command commitment and a systematic management approach, each contracting activity implements those techniques which are best suited to their procurement mission in achieving maximum practicable competition.

These techniques cross the entire spectrum of the acquisition process ranging from planning and requirements generation process through contract award. In addition, various management "checks and balances" are also employed throughout the acquisition process. They are designed to assure that each procurement activity exerts full effort to this important area. The overall process to enhance competition is periodically reviewed for effectiveness by the Army Acquisition Management Review Teams, Army's IG, etc.

A survey of our procurement activities, conducted in response to Mr. Carlucci's recommendations, has confirmed that a variety of techniques and methods are employed to increase competition. Of these, the most effective appear to be:

> Command Reviews; Contract Review Boards; Advance Acquisition Planning; Breakout Programs; Second Sourcing; Use of Commercial Items; Reviews by Small Business Technical Advisors.

Subject: Increasing Competition in the Acquisition Process.

In addition, the Army has recently conducted research on enhancing competition in the acquisition of weapon systems. We have also conducted a study of "white collar services" contracts with a view towards minimizing sole source awards. Actions have been taken to implement a management control system to increase competition for the acquisition of consulting and related management support services.

The Army's management objective for greater competition is to continue to emphasize the need for active command involvement to insure that available techniques to enhance competition are effectively employed in their procurement operations. Recommendations from studies on enhancing competition and analysis of current management techniques used by Army Contracting Activities (HCA's) will result in new policy and procedural guidance which will be promulgated through the Army. Performance will be evaluated, problem root causes analyzed, and necessary action will be initiated to achieve maximum practicable competition within the Army.

Each of the Army's HCA's has been requested to establish a comprehensive management plan to include contracting goals and objectives with appropriate management oversight procedures to insure maximum competition. These plans will be tailored to the unique needs of individual activities but will be disciplined through establishment of carefully developed goals that will be monitored through the appropriate headquarters and the Department of the Army.

ARTHUR DAOULAS,
Deputy Assistant Secretary of the Army (Acquisition).

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY,
Washington, D.C., November 13, 1981.

MEMORANDUM FOR THE UNDER SECRETARY OF DEFENSE (RESEARCH AND ENGINEERING)

Subject: Increasing Competition in the Acquisition Process.

The Navy strongly endorses the effort to enhance competition in the acquisition process and we believe it deserves the full support of every acquisition manager in the Navy. Secretary Carlucci underscored this concept by his memorandum of July 27, 1981, in which he designated increasing competition as an additional recommendation for improving the acquisition process. The memorandum also requested the Navy establish management objectives for enhancing competition.

The Navy is continuing its efforts to obtain maximum competition by the following means:

(1) The objective of increasing competition, along with other goals for improving the acquisition process, should be a management objective for all senior civilian and military personnel having major acquisition responsibilities. We are requiring that particular emphasis be executed in the improvement of competition for contractor

support services. Significant contributions in the attainment of these objectives will be documented in performance evaluations, as appropriate.

(2) The 1979-80 Navy Competition Plan will be updated to ensure that new competition initiatives are incorporated and implemented, including reemphases through the Navy's Contracts and Business Policy Advisory Board. This group, comprised of the senior Department of the Navy contracting managers, will be tasked to identify and evaluate the areas where real opportunity for increasing the use of competition exist.

(3) The Navy is in the process of issuing its revised policy and implementation instruction on Acquisition of Major Weapon Systems to assure competitive Acquisition Strategies. Additionally, a more detailed Chief of Naval Material Instruction on Acquisition Strategies has been recently issued and will contribute to the goal of enhanced utilization of competition. Both instructions will require Program Managers to ensure that competition is addressed early in a program's existence and considered throughout the development and subsequent production. They will provide a planning basis to ensure that the technical, financial, and business communities are thoroughly coordinated so that the full potential for competition is realized. The Acquisition Strategy will also require the identification of the investment and resources needed to pursue competitive procurement.

However, we are also including a note of caution. While the Navy will continue to seek and expand competitive opportunities, undue competition can be harmful to a program and lead to increased costs. For example, in the case of serial production, a contractor, who has incurred large initial capital investments, and is now producing acceptable quality on a reasonable production learning curve is unlikely to feel true pressure from competition. Competition mandated in this circumstance could produce a buy-in from a new contractor, resultant losses, schedule slippages, low quality product, fleet support problems, and severe problems for the program manager. On the other hand, production programs having quality and cost problems might be more susceptible to the impact of meaningful competition and should be pursued. In many cases, the simple threat of competition has been a positive factor in causing increased contractor management concern and the allocation of more capable resources to a program.

There are also some realities of the Department of Defense system that inhibit competition and need to be mentioned. First, past emphasis on meeting obligation plans has resulted in placing management priority on rapid procurement rather than taking the necessary time to fully explore competitive opportunities. With increased dollars and a continued emphasis on obligation plans and other priority activities, the resources needed in the technical, financial, and contracting communties to accomplish the detailed planning and specifications necessary are sometimes at odd with additional competition becoming a reality. This will, of course, be further compounded if the planned increased DOD budget is offset by reductions in manpower, particularly at the GS-13/15 and equivalent military levels. Relief from existing manpower ceilings would greatly facilitate our program to increase competitive procurement.

Opportunity for competition is also inhibited by a programming system that does not allow a sufficiently long enough production buy or a stable program which will permit meaningful production competition and a realistic amortization of startup costs. As a result, most of our major programs revert to a series of single year procurements which are typically sole source. The expanded use of the multi-year procurement funding process that stresses competition could be a significant factor in achieving the competitive economic or quality cost benefits that have been sought by Defense officials for many years.

A final comment relates to the statistical reporting system. Too often, the current DOD approved method of collecting data does not contribute to a clear understanding of the competitive nature of some of our acquisitions. For example:

1. The Defense Acquisition Regulation (DAR) procedures require that follow-on production contracts to the winning development contractor be categorized as "noncompetitive." Consequently, many of our major weapon system production contracts (airframes, ships, submarines, etc.) which were originally competed during development, are considered "noncompetitive" for their production duration. Accordingly, because these "follow-on sole source" weapon systems represent increasing significant proportions of Navy procurement dollars, the opportunities to enhance competitive dollars, statistically, is limited. We need to do a better job of educating the GAO and Congress to the major dollar weapon systems such as TRIDENT and nuclear carriers that are by necessity sole source and to those competitively developed programs that have limited follow-on competitive opportunities. We must concen-

trate our efforts on expanding the truly untapped competitive market opportunities such as supply support and contractor support services.

2. Additionally, we give no visibility to the degree of competition that exists at a subcontract level. As a result, significant competitive acquisitions at the subcontract level are not identified and we are unable to provide to the Congress the actual number of U.S. industrial concerns that have received DOD dollars competitively at the subcontract level. Since approximately 50 percent of prime contract dollars result in subcontracts, the impact of competitive subcontracting should be given visibility, and the reporting system modified to permit that visibility.

3. In summary, the Navy continues to recognize the myriad of benefits to be derived from competition and the Chief of Naval Material has been designated the Navy's focal point to ensure our overall contractual efforts reflect our enhancement objectives.

EVERETT PYATT,
Principal Deputy, Assistant Secretary of the Navy (Shipbuilding and Logistics).

Senator LEVIN. My next question is this: When we get down to specifics, as to how we can improve competition, I, along with Senator Cohen, have done what Senator Nunn, Senator Rudman, and Senator Mattingly—and there was a fourth, Senator Stennis—have done in the area of cost overruns. We filed an amendment. We prepared some legislation to the authorization bill in the Armed Services Committee. Our amendment is really pretty simple. It says that for contracts over $100,000—which are already covered by that 10-day rule—that we will give potential competitors 30 days in which to file a proposal.

That is the heart of that legislation. It fully applies to a relatively small percentage of contracts. I think less than 10 percent of our contracts are over $100,000.

In any event, it is part of the larger total, which now must be published and where there is a 10-day opportunity for a competitor to file an alternative proposal. First, in the Armed Services Committee, Senator Cohen and I run into the DOD opposition and DOD says they do not like it because it applies to follow-on contracts.

We say what is wrong with that? And after arguing that out for a few days, we give up and say, "All right, we will exclude follow-on contracts along with a whole host of other exclusions." We exclude follow-on contracts and the Senate Armed Services Committee adopts a little procompetition amendment. We get to the Senate floor, the Senate adopts it. We get to conference, well, there is the DOD opposing us again. That is where I am going in 10 minutes, to take your guys on on a little procompetition amendment. I am not done yet because the DOD objection in conference is that there is too much paperwork in the Levin-Cohen amendment. They don't like the reporting requirement. So we say we will eliminate the reporting requirement. All we have is a 30-day requirement and a little more description of the contract. We are still fighting the DOD. All I want to tell you, without spending too much time on that—I agree with Senator Rudman—it looks to me as though we are constantly in an adversary proceeding; the Armed Services Committee, Governmental Affairs, Appropriations Committee, listen to these noble words about competition, trying to draft their own amendments.

I know that Senators Rudman, Nunn, Mattingly, we still constantly run into opposition and I predict we are going to lose this little Levin-Cohen amendment because the House is listening to the DOD and they are going to say, "DOD still has problems with it. Let's have some more hearings." So much for competition, and I guess there will be some more hearings unless we prevail in the conference.

I want to press you on something you said today, now that I got that out of my craw. I think Senator Mattingly or Senator Cohen asked you also about the work of CAIG, an agency which is supposed to give us independent evaluations on the cost of programs.

I would like to know, first of all, what role CAIG had in the estimate of the B-1 bomber that just came out $19.7 billion.

Mr. **Carlucci**. Let me ask Mr. Margolis who chairs CAIG to address himself to that question.

Mr. **Margolis**. We had a very active role in B-1 cost estimates in the 1976 period. That was the last DSARC.

Senator **Levin**. I am talking about this recent proposal of $19.7 billion. Did you have an active role in that estimate?

Mr. **Margolis**. No.

Senator **Levin**. Why not?

Mr. **Margolis**. The Air Force is first presenting their estimate of the B-1 to me this coming Wednesday.

Senator **Levin**. You mean you haven't seen that estimate of the Air Force at all, or how its methodology was arrived at?

Mr. **Margolis**. I have gotten some prebriefs but the first full briefing to my group takes place this Wednesday.

Senator **Levin**. On the basis of the prebriefing, do you approve of the methodology they use?

Mr. **Margolis**. There are two estimates, by the way. There is an independent Air Force estimate and there is a program manager's estimate.

Senator **Levin**. Which is which, how much is the $19.7 billion and how much is the other?

Mr. **Margolis**. The $19.7 billion is the program manager's estimate. The R.D.T. & E. component of the independent estimate is higher.

Senator **Levin**. So the estimate we were given was the low of two estimates?

Mr. **Margolis**. The independent estimate was not released at the time you got the $19.7 billion.

Senator **Levin**. What was the independent estimate?

Mr. **Margolis**. You mean what is the difference between the two?

Senator **Levin**. Yes, dollar-wise.

Mr. **Margolis**. Yes. It is $½ to $1 billion.

Senator **Levin**. So the independent estimate is somewhere between $20.2 billion and $20.7 billion?

Mr. **Margolis**. That is correct.

May I add, there is another component to it, and that is the independent estimate looks into some additional subsystems for the B-1, which will add additional money to the program, which are not in the $19.7 billion.

Senator **Levin**. Are they in the $20.7 billion?

Mr. **Margolis**. No.

Senator **Levin**. So there are some additional components—

Mr. **Margolis**. Potentially additional subsystems which have not been approved by either the Air Force or OSD.

Senator **Levin**. Do you approve of the methodology from what you have seen?

Mr. **Margolis**. On the independent estimate, I have not gotten the full briefing.

Most of what I got is on the airframe structure. It looks fairly reasonable. I am particularly interested in the avionics. I haven't had that briefing yet. There has been considerable expansion of the avionics suite since 1977, when I last worked on the airframe and I am not familiar with the difference.

Senator **Levin**. Do you have any concerns about the methodology from what you have seen in the prebriefing?

Mr. **Margolis**. On the airframe?

Senator **Levin**. All the prebriefings relative to the methodology?

Mr. **Margolis**. I have not gotten the avionics, Senator.

Senator **Levin**. Based on the prebriefings you have had, do you have any concerns about methodology?

Mr. **Margolis**. Of course, I have concerns for something I haven't seen, and naturally with a system that is that expensive, that sophisticated, it is part of my job to look into it very closely.

I have not had the opportunity to do that yet.

Senator **Levin**. You then did not participate in the figure, CAIG did not participate?

Mr. **Margolis**. That is correct.

Senator **Levin**. I don't understand why, but we will let that one go because I have got my yellow light. In the prebriefings that you did get, you cannot say that you are satisfied or not, you want to see more?

Mr. **Margolis**. Absolutely.

Senator **Levin**. There were two figures, one was $19.7 billion, which was the one released to the public by the Secretary.

Mr. **Margolis**. Yes.

Senator **Levin**. And the other was $½ to $1 billion more, the independent one, in the Air Force?

Mr. **Margolis**. Yes.

Senator **Levin**. That was not released to the public, is that right?

Mr. **Margolis**. It has not yet been released to the public, to my knowledge.

Senator **Levin**. Finally, there are some additional systems which may be placed on that plane and we know now may be placed on that plane which were not even part of the larger independent estimate, is that right?

Mr. **Margolis**. That is correct.

Senator **Levin**. That is, I think, a little example of that chart we have staring us right in the face about estimating and other, 7.8 percent because that is the way it has been presented to the public, $19.7 billion. We are not told about the existence of another estimate which is up to $1 billion more. We are not told about the fact, and it is a fact, that there are systems that may have to be placed on that plane, which we know about right now which were not included, even in the higher estimate.

CAIG was not involved in the estimate at all. So, Mr. Chairman, I think the B-1 description just of a few weeks ago, that we got already, falls into the category of mistaken and low estimating in "Other", 7.8 percent of cost growth.

Mr. MARGOLIS. Might I add a point?

Senator LEVIN. If the chairman wants to give you time.

Chairman ROTH. Please.

Mr. MARGOLIS. That system has yet to come to DSARC. When it does, I will have an opportunity to present my estimate, my view of the Air Force program manager and independent estimate.

Senator LEVIN. When will that be?

Mr. MARGOLIS. Fairly soon.

Mr. CARLUCCI. Let me emphasize, the point at which the emphasis starts is a DSARC milestone.

I would take issue with Senator Levin saying that the system is underestimated. We are presently testifying before the appropriate committees, which Senator Levin is a member, on the cost of the system. The costs made public were order of magnitude figures which will be refined as we go through the process. When you are talking about cost escalation over a period of years, we start from the best estimate that we can produce and that is done through the CAIG-DSARC process.

Senator LEVIN. Mr. Chairman, if I could respond in 30 seconds to that. Right now I am going to a conference where we are either going to approve or disapprove money for the B-1 bomber, and we are going to base it on a $19.7 billion estimate given to us by the Secretary of Defense. He didn't tell us about a whole host of items that were excluded from that estimate which we know may have to be on that B-1 bomber.

Mr. CARLUCCI. We are presently testifying before Senator Warner's subcommittee——

Senator LEVIN. I was there this morning. Nobody told Senator Warner's subcommittee about those potentially needed systems we may have to add. Not a word has been breathed, breathed, whatever you do with words. I think Senator Cohen is here and will be able to support me. We have never had any suggestion that there is a whole host of systems which may have to be on that B-1 bomber and we know may have to be on that B-1 bomber that have been left out of the $19.7 billion. We never were told about an independent estimate in the Air Force which is up to $1 billion higher than the $19.7 billion, even without those additional items.

Senator PRYOR. Senator Levin, if I might say, that $1 billion difference equals the entire budget for the State of Arkansas, just to give you an example of what we are talking about.

Mr. CARLUCCI. We are talking about R. & D. and procurement of 100 aircraft, too, Senator Pryor.

Senator COHEN. How can Arkansas spend so much money?

Chairman ROTH. Mr. Carlucci, I don't think we are going to resolve that particular issue. I would make one general comment on CAIG. It is my understanding from some of our other witnesses that it has a pretty good record of cost estimates, better than the services' and the suggestion has been made that they ought to be more involved in reviewing the services' guesstimates on costs, particularly on the critical ones, as a means of getting more realistic estimates of the cost of weapons. I don't know if you care to comment on that today or not but I would urge you give this careful consideration.

Mr. CARLUCCI. I think that has been suggested.

Chairman ROTH. We have spent 2 hours and I appreciate your patience and willingness to be here. There may be further questions. I know I have a number, but rather than take further time at this time, we can submit those in writing if you will be good enough to answer them in writing.

Mr. CARLUCCI. I will be pleased to do so, Mr. Chairman.

Chairman ROTH. Thank you very much, Mr. Carlucci. We look forward to working with you in attempting to improve on this whole system of procurement. As I said earlier, I feel strongly that we ought to take a look at the laws on the books, the rules and regulations in an effort to both simplify and make them more effective. We welcome your recommendations.

Mr. CARLUCCI. We agree with that, Mr. Chairman. Thank you very much.

Chairman ROTH. Thank you.

[Mr. Carlucci's prepared statement and responses to written questions submitted by Senators Roth, Sasser, and Levin follow:]

PREPARED STATEMENT OF FRANK C. CARLUCCI

Mr. Chairman and Members of the Committee: I am pleased to appear today to discuss our progress in improving the Defense acquisition process, reducing weapon systems costs, and improving military readiness. Much has been said and written about the Defense acquisition process, a system which is often misunderstood. There are many myths about cost overruns, the impact of inflation, and the management process in the Department. I hope I can present some facts and shed some light on the subject today. I intend to tell you what Secretary Weinberger and I found when we took office, what we've done, where we are headed, and how we are trying to insure that we will succeed.

WHAT WE FOUND

On March 2, 1981, we directed a 30-day assessment of the Defense acquisition system with the priority objectives of reducing cost, making the acquisition process more efficient, increasing the stability of programs, and decreasing the acquisition time for military hardware. The final conclusions reached by our assessment team were not new but had been made by numerous observers of the DoD acquisition process, including many members of the Congress and the GAO. We did, however, pull them together in a comprehensive way. These are some of the principal problems we identified:

We try to do too much at one time by looking for quantum jumps in capability, which is excessively costly;

Early costs, schedule, and performance estimates are overly optimistic;

Readiness considerations are secondary to hardware procurement and deployment;

Too many systems compete for scarce resources—we fail to fund the higher priority systems fully;

Too much paperwork and too many regulations in the process;

Too many reviews of technical issues by OSD and Congress (micro-management);

Instability caused by starts, stops, stretchouts, redirections and inordinately long decision times; and

The process discourages capital formation and investment.

Our conclusions were reinforced in a major study on DoD procurement released just last week by the House Appropriations Committee. In forwarding the study, the Chairman and other key members of that Committee summarized the problems that the Surveys and Investigations staff had found. They sound very much to me like a replay of what we found.

A principal impact of these and other problems is that they directly or indirectly cause cost growth. Our effort to reduce cost growth is the major focus of my testimony today. First, let me tell you my perceptions of the causes of cost growth. Obviously, unpredicted inflation is a major contributor, accounting for about 70 percent of the total cost growth; 40 percent of this is due to actual inflation being different from our projections, and 60 percent is the inflationary effect associated with program changes. The most significant changes that affect program cost growth are quantity and schedule changes, which are usually caused by a lack of dollars to fund the program adequately. Low initial program estimates are also a major cause and are fueled by optimistic contractor proposals to win competitions and program managers who want to see their programs funded. In addition, our systems take several years to reach production. During this time threat and requirements change. In transitioning from a paper design to hardware, not every component develops smoothly. These changes almost always increase program costs.

Let me say a word about one area that requires special understanding on the part of all of us. In any endeavor of the size and complexity of the national defense program, there will always be a requirement for careful management. As we train a future generation of senior acquisition managers, there will be opportunities for second-guessing some judgments made in the implementation of some programs. I ask that members keep individual cases in perspective and attempt to distinguish those resulting from errors in implementation from those that suggest defects in overall policies.

There is a tendency to attempt to develop controls on the procurement process for every real and perceived mistake or problem. The continued imposition of legislative rules, procedures, and reports further encumber an already overburdened process. We pay for these requirements not only through increased government and contractor administrative costs but also in a shrinking of the industrial base as the added complexity of procurement drives potential sources away from the defense market.

HOW WE INTEND TO SOLVE THESE PROBLEMS

On April 30, 1981, I signed a memorandum directing that significant changes be made in our acquisition process. Basically, it requires that we implement good business management throughout the DoD acquisition community. Secretary Weinberger and I endorsed eight major acquisition management principles and directed 32 separate actions to improve the process. You already have the document, so I will just summarize here.

The management principles included: improving long-range planning; delegating more responsibility and authority, while strengthening accountability; using lower risk approaches; using more economic production rates; making costing and budgeting more realistic; considering readiness and sustainability from the start of programs; strengthening the industrial base; and stressing maximum competition.

The 32 separate actions to improve the process include: (1) Reducing acquisition costs by increasing program stability; implementing multi-year procurement; simplifying procedures, regulations, and legislative requirements; encouraging capital investment to increase productivity; promoting economic production rates; and budgeting to "most likely costs," (2) Shortening acquisition time by using preplanned product improvement and adequately funding test hardware, (3) Improving support and readiness by providing incentives for reliability and maintainability and establishing readiness objectives early, (4) Improving the DSARC process by moving toward controlled decentralization, reducing data and briefings, and tying the acquisition process more closely to the PPBS.

WHAT WE HAVE DONE SO FAR

When we announced our new initiatives, we recognized the problem of implementation and admitted it was as important as the decisions themselves. We recognized fully that not only had the acquisition process been studied numerous times, but many of our initiatives had been tried before and never really got very far.

At the time of the decisions, we assigned overall responsibility for implementing to Dr. DeLauer, the Under Secretary of Defense for Research and Engineering. He was asked to establish an appropriate implementing and reporting system. I receive periodic reports from the Services and Dr. DeLauer on these initiatives. A copy of the latest report has already been provided to the Committee staff.

Let me highlight for you some of the specific ways in which we are going about implementing our Acquisition Improvement Program.

1. Program Stability.

A. We have asked the Services to identify candidates for a list of stable programs to which we would make a management commitment to provide stable funding. The Services have supplied preliminary lists, and we will be working with all three Services to establish a consolidated list of about 30 major programs, which we would attempt to stabilize.

B. Recognizing that some programs must be eliminated to make room and achieve stability for others, Dr. DeLauer recently testified regarding programs that have been terminated this year. Some have been eliminated during preparation of the Services' Program Objective Memoranda (POM), and others by the Defense Resources Board during the POM review this summer. So far this effort amounts to about $1.8 billion in fiscal year 1983 and about $7.5 billion over the five-year period we are examining. It is very important that Congress support this effort, even if it means closing down some production lines, a matter of high Congressional interest.

C. We are also taking a very hard look at major system new starts for fiscal year 1983. We have had special meetings of the Defense Resources Board and are conducting our reviews as part of the Planning Programming and Budgeting Process this year by integrating the Mission Element Need Statement review into that process. We will further scrutinize proposed fiscal year 1983 new starts in our fall budget review, which is just now getting underway.

2. Multi-year Contracting:

We believe that substantial savings can be gained by authorizing certain programs to proceed with multi-year contracts and thereby work to benefit both our defense posture as well a· the industrial base. Multi-year procurement could result in average dollar savings of 10 to 20 percent in unit procurement cost through improved economies of scale and efficiencies in production processes, economy-or-scale lot buying, decreased financial borrowing costs, better utilization of industrial facilities, and a reduction in the administrative burden of placing and administering contracts.

We have just released a budget justification package to the Appropriations and Armed Services Committees on major multi-year contracts. We are proposing to use multi-year on four programs in fiscal year 1982: the F-16, C-2, Blackhawk, and the Troposcatter Radio. If we are successful, this approach will result in cost savings of almost $400 million over the life of these contracts. We hope, of course, to have additional multi-year candidates for fiscal year 1983 and following years as other systems mature to the point where we can use this technique.

3. Preplanned Product Improvement.

A major factor that has contributed to the increased time and costs associated with fielding new weapons systems has been our preference, often made of necessity, for high technology systems. While we should not abandon the advantages we have won through high technology programs, strategies for our programs should adopt a more evolutionary approach. This type of an approach will allow us to field more systems sooner at lower cost while we continue to develop higher performance alternatives. This concept is being incorporated in our Preplanned Product Improvement (P^3I) program and is currently being implemented within the Services. In response to my request, the Services are identifying specific programs for which the P^3I approach is appropriate and will be reflected in future Service budget submissions. So far we have identified about 40 candidate programs where this technique may be used.

4. Front-End Planning:

The keys to reducing acquisition time and cost lie in proper tailoring of a program, the identification of an efficient strategy, and the provision of adequate, stable funding to execute that strategy. Aside from the funding issue, major emphasis must be placed on the front end of the program if we are to avoid some of the common pitfalls that have often characterized program performance in the past. I have issued policy guidance to the Services to assist them in developing acquisition strategies that emphasize early attention to the demands of quality assurance, reliability, readiness, and supportability. We will provide incentives to industry to focus on these objectives early in the acquisition process. We have developed a publication, "Guidelines for Contractor Incentives," designed to help program managers meet this goal. In addition, specific readiness goals are being identified by the Services for their major programs so that we can assess our progress in meeting these objectives as we proceed through the acquisition process.

5. Lowering Administrative Costs:

Reporting requirements that involve "mountains" of paperwork are currently undergoing a thorough review. Joint working groups are examining OSD directives and Military Department regulations for areas where reductions can be made without affecting essential elements of the acquisition process. Our Financial Management Information System (FMIS) is being reviewed in an effort to simplify and reduce internal reporting requirements on major weapons systems to an efficient minimum. Documentation required for DSARC milestone reviews has been reduced in length and scope.

Many thresholds that currently govern our acquisition process predate the recent years of high inflation. The result has been that much management attention is focused on issues whose "real" value is half of what it was in 1974, for example, when a threshold may have been established. Revision of such thresholds, to bring them in line with current costs, will alleviate the significant costs of inefficient management attention. For example, we have redefined a major system from prior threshold levels of $100 million in R&D or $500 million in procurement to new levels of $200 million and $1 billion respectively. As a result, ten major programs that required DSARC review under the old thresholds, have reverted to the Services for management review.

Other significant thresholds that need to be revised are contained in the House Authorization Bill for fiscal year 1982. If approved by Congress, dollar thresholds for the use of simplified small purchase procedures will be increased from $10,000 (set in 1974) to $25,000; contractor submission and certifications will increase from $100,000 (set in 1962) to $500,000; and the requirement for Service Secretaries to authorize negotiations for R&D involving more than $100,000 (set in 1962) will be revised to $5 million.

One of the initiatives to improve the acquisition process is to reduce the unnecessary and non-productive efforts of existing legislation on procurement. We plan to propose selected revisions of certain legislative requirements. Several such measures are being considered by the Administration. Measures of this type are more conductive to the business climate today and will reduce our costs of doing business.

6. Streamlining the DSARC Process:

Changes that have been made in the DSARC process reflect our belief in participatory management and in the need to reduce administrative requirements. There are now two major milestones in the DSARC process instead of four, and requirements for DSARC documentation have been similarly reduced. New start programs are now reviewed as part of the PPBS process and will enter the DSARC process at the first milestone. Also, Services Secretaries now serve as principal members of the DSARC. These changes will simplify the process without weakening oversight and accountability. It should be remembered that senior management can call a program up for review at any stage in the process.

7. Increasing Productivity:

Aside from measures we are taking to improve program stability, increase multiyear contracting, and reduce administrative costs, we are taking a number of other significant steps to encourage and revitalize the productivity of our industries.

We strongly supported the Administration's legislative initiatives in the Economic Recovery Tax Act of 1981 which Congress has approved to permit more rapid capital equipment depreciation.

We have issued guidance to program managers that encourages contracting to permit companies to share in cost reductions resulting from productivity investments. An example of shared cost reduction on a large scale is our ongoing joint effort with General Dynamics in the F-16 program. We entered into a joint agreement with General Dynamics wherein the Air Force invested $25 million in Manufacturing Technology funds to demonstrate state-of-the-art production techniques on the factory floor and the contractor committed $100 million toward capital investment to produce the F-16 more economically. The Air Force has already recouped its initial investment toward a total projected savings in excess of $370 million over an expected production run of 1,388 aircraft. General Dynamics' initial share of the savings is projected at $150 million plus a potential award fee.

In order to provide an improved cash flow environment conducive to greater investment and improved productivity, we have raised progress payment rates across the board 10 percentage points and have implemented a plan for flexible progress payments that minimizes contractor investments in its operating capital requirements. At the same time, we have provided for a more efficient, less costly way to make progress payments (once a month versus twice a month).

We are increasing our emphasis on Manufacturing Technology and Technology Modernization Programs in order to increase productivity in defense industries over the long term. We plan substantial investments in the next five years to be used in support of these and other industrial base programs.

8. Competition:

It is firm DOD policy to purchase required supplies and services on a competitive basis whenever possible. This has been so much a fundamental basis of our procurement regulations and our reform proposals that we did not believe it needed to be repeated in the April 30 directive. In my recent appearances before Congress, however, it was strongly suggested that increasing competition be made explicit. I therefore added this as a 32nd initiative and directed the Military Departments and Defense Agencies to intensify their efforts toward increasing competition. In fiscal year 1980, 36 percent of our procurements were the result of price or technical/design competition. Another 21 percent were follow-on awards for items from sources that had been initially established as a result of competition, for example, the F-15 and F-16 aircraft production awards. Statistics for the first nine months of fiscal year 1981 reflect significant improvement. Procurements resulting from price or technical/design competition have risen from 36 percent to 42 percent and follow-on awards have risen from 21 percent to 24 percent. For some major systems, single source awards are the only practical course (e.g., Trident missile, aircraft carrier, etc.). But the majority of our funds continue to be awarded either as a direct result of competition, or in follow-on awards where the source was competitively selected, and our performance is improving.

There are, of course, dangers in over-emphasis on competition, as important as it is. Unless we are careful we may undercut our effort to reduce buy-ins where the contractor intends to get well through changes and subsequent procurements. This practice not only leads to program cost growth, but also to a further drying up of the Defense industrial base. We want meaningful competition at realistic prices. We will strive to assure that competition is used to the maximum overall advantage of the government and is conducted in a fair and impartial manner.

There has been a very intense effort on the part of the Services during the past few months on these initiatives. They are the prime implementors, and they have taken forceful action.

We have made implementation of the acquisition improvements an important objective of our newly established DOD Council on Integrity and Management Improvement that I chair. This Council includes the Under Secretaries of each of the Military Departments, Dr. DeLauer, Larry Korb, the ASD(MRA&L), and Joe Sherick, the Assistant to the Secretary of Defense (Review and Oversight). We have also instituted a series of Secretarial Performance Reviews where Secretary Weinberger and I deal directly with the Service Secretaries on topics such as this. Through these means I intend to exert personal pressure on our effort to insure that we really do achieve major reform of the acquisition system.

CONCLUSION

Mr. Chairman, I want to stress again that during the last six months there has been a substantial change in philosophy and policy with respect to the acquisition of the products and services used by our Armed Forces. We face an important challenge. The Department and industry have a long way to go to insure that necessary changes are implemented all the way down the line, but I think we have made an important beginning. Predictions of failure and comparison with past real or alleged failures are not helpful to our efforts. The acquisition improvement program I have described has been in effect about six months. There are no panaceas, but we know we are on the right track.

There is a great deal of enthusiasm for the improvements and wide participation within DOD. We are going to make certain we follow through. In some areas we can do better, especially with the help of industry and the Congress. Principal among our needs is a joint commitment to longer term program stability. With faith in ourselves, and your support, we can and will improve our acquisition efforts.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

Question 1. Have you forced the services to justify their cost estimates for new weapons programs? Which cost estimates are sent to Congress for its review: those of the Service or those from the Secretary's office or other independent sources?

Answer. The Cost Analysis Improvement Group (CAIG) was established within the Office of the Secretary of Defense to advise the Defense Systems Acquisition Review Council (DSARC) on matters related to cost. Each Service has also established staff components to make independent cost estimates. Prior to each DSARC, the Service presents, to the OSD CAIG, its estimate of program cost along with the estimate prepared by the independent Service staff component. These estimates are reviewed by the CAIG which then presents its assessment to the DSARC following the Service presentation of its cost estimate. The OSD CAIG assessment may include either a partial or a completely new independent estimate prepared by the CAIG as appropriate.

The estimate presented to Congress represents the Department's best estimate based on consideration of estimates provided from all sources. Depending on the circumstances, this estimate could be any one of the estimates presented for review or it could be a synthesis of all.

Question 2. Is there some level of cost overrun for major weapons that you just won't tolerate? What happens in DOD when there is a substantial cost overrun on a weapon?

Answer. A precise answer to your question is not possible. However, if a system's cost exceeds the cost of a viable alternative, that system would be considered for termination.

Cost thresholds are established for Major Systems Acquisitions at each DSARC Milestone. When those thresholds are exceeded, the program is reviewed either through staff action or by convening the DSARC for a special program review, depending on the circumstances. If continuation of the program is warranted, new cost thresholds are established.

Question 3. One of your initiatives calls for DOD to "realistically and fully fund programs" to avoid excessive cost overruns and to budget more effectively. Yet, the B-1 program is presented to Congress with almost no specific documentation and evidence that it may cost $10 billion more than its $20 billion price tag. Is this an example of realistic budgeting? Have you challenged the estimates provided by the services of the B-1? Can you provide the Committee with specific cost estimates for the plane?

Answer. The Office of the Secretary of Defense conducted an in-depth review of the B-1 cost data provided by the System Project Office (SPO) and the results of the review of the SPO's cost projections by the Air Force Independent Cost assessment team. As a result of this review which built an actual costs associated with the original B-1A development and production program, I feel with vigorous management, stringent configuration control, and hard negotiations the Department can procure 100 B-1B aircraft and related support within the $20.5 billion (in FY 1981 dollars) I have esablished as a firm goal. The specific cost elements of this goal are:

	Billions
R.D.T. & E	$2.4
Procurement	16.2
Spares	1.1
Cruise missile carriage	.8
Total	20.5

Question 4. One of the claims made against the use of so-called dual-sourcing is that it is expensive to tool up two different contractors to produce the same weapon. Yet, as the DSB noted in 1979, "Data is generally lacking on the total investment cost for bringing a second source into being." Why is data not being developed on the dual-sourcing concept? Why was the dual-sourcing concept not part of your memorandum of April 30, 1981? Do you believe the idea can save money?

Answer. Making second sourcing decisions is a complex undertaking. Because the many factors bearing on the decision have wide variation in impact, each program must be examined on a case-by-case basis. It is also difficult to make more than generalizations using previous case histories covering different commodities, technologies, market sizes, business base conditions, etc. Improvement of data bases and our ability to analyze and predict are a continuing effort, nonetheless. We currently are examining in detail the potential benefit of second sourcing the Fighting Vehicle System. The Army has let three contracts to likely second sources for an assessment of the investment requirements, schedule, and production costs entailed. The results of this effort will be useful to the FVS second sourcing decision and subsequent second sourcing issues.

Dual sourcing is a useful technique for obtaining and preserving competitive environments. Because competition is such a fundamental part of the fabric of DoD procurement initiatives, it was not reiterated in the April 30 memorandum. It has since been explicitly added.

Dual sourcing will save money in the right circumstances. To amortize the frequently high investment costs of establishing and qualifying the second source, a stable inventory production requirement of long term duration must be present. The annual quantities to be bought must be large enough to support two manufacturers at economical production rates. If dual sourcing at the prime contractor level is not feasible, second sourcing lower tier vendors and suppliers is still considered.

Question 5. Why was the idea of competition left out of your original initiatives issued in April? Even though the notion of competition has been around in the Federal government for years, it is obvious that it could stand some strong reinforcement. Did you honestly feel that competition did not need to be stressed again? Didn't it leave the clear impression to the Services that the omission of competition from your memorandum meant that this matter was of lower priority?

Answer. The original initiatives issued in April were based on my decisions, as I stated in my memorandum of April 30, ". . . to make major changes both in the acquisition philosophy and the acquisition process itself." It was also decided to keep the list relatively small so that management attention could be concentrated and results optimized. It was not considered necessary to include competition in the original list as it is not a new concept or philosophy. Enhancement of competition has been a major effort and a significant goal for many years. There was no intent to detract from its importance nor did we feel that its omission from the list of initiatives would give the Services any impression that competition was of lower priority. It has been continually stressed by all levels of management. It was anticipated that the ongoing effort would continue undiminished. However, congressional reaction to the omission of competition caused me to review the matter and add a new initiative on improving competition in the acquisition process.

Question 6. Do you believe that the Defense Contract Audit Agency (DCAA) is doing a good job of helping to reduce costs and improve procurement at DoD? Are there any plans to expand DCAA's important role?

Answer. Defense Contract Audit Agency (DCAA) is doing an excellent job helping to reduce costs and improve procurement at DoD. During fiscal year 1981 alone, documented cost savings due to audits performed by DCAA approached the five billion dollar mark. Based on DCAA's annual budget of around 110 million dollars, its savings in 1981 produced a rate of return to the taxpayer over 40 to 1. Over the years, such contract audit savings have been reflected in DoD budgets as lower weapon systems costs.

DCAA's very presence in the contracting arena acts as a deterrent to the incurrence of excessive contract costs. Each year the Agency is involved in auditing over 13,000 different contractors, maintaining around 400 field audit sites in or near contractor offices and plants throughout the world. In 1981 DCAA reviewed nearly 35,000 contractor price proposals aggregating over 200 billion dollars, and examined 39 billion dollars of incurred contract costs.

Through continuous development and application of productivity improvements in auditing, DCAA's cost effectiveness over the years has more than kept pace with inflation and the increasing complexity of contract audit requirements.

DCAA plays a particularly important role as a catalyst for improved industrial productivity during this critical period when we must strengthen the industrial base to meet Defense acquisition requirements. Traditional operations audits by DCAA (audits aimed at increasing the economy and efficiency of contractor operations) have enabled DoD to avoid over 800 million dollars of contract expenditures during the past five years. We believe the cost avoidance potential can be increased by expanding DCAA's capability to accomplish more technologically advanced operations audits. This expanded contract audit role will support the Department of Defense initiatives for improving the acquisition process. The DCAA program will complement and not duplicate other DoD moves to strengthen the industrial base and encourage productivity-enhancing investment in the defense industry.

Successful accomplishment of DoD's acquisition program requires continued effectiveness of the DCAA contract audit mission. Independent professional audit advice on contractors' estimated and incurred costs is an essential element of cost control in the procurement process. In line with our planned increases in procurement expenditures on major systems, we recognize the necessity to increase DCAA resources over the next few years. This requirement is receiving careful attention in the current budget reviews, and we will assure optimum DCAA support to DoD procurement.

Question 7. My understanding is that the only way to achieve good survival penetration low air defenses (now or in 1995 with Stealth) is to fly in 100 percent radio silence at or below treetop level, following narrow valleys, riverbeds, etc. This defeats ground radars and airborne radars. To fly really low requires high maneuverability, high acceleration and moderate speed. Doubling speed more than quadruples exposure time above the radar horizon, because the faster you go, the less closely you can follow the terrain profile.

I understand that the B-1 will be the least maneuverable bomber we have ever built because turn capability is basically determined by how heavily every square foot of wing is loaded. The B-1 is loaded 40 percent more heavily per square foot than the extraordinarily maneuverable F-111 A/F. It is loaded 2½ times more heavily than a 727. In acceleration, the B-1 is very sluggish because its thrust is only 26 percent of its weight, as opposed to 45 percent for the B-58 and 50 percent for the F-111F. Even the 727 has about a .30 thrust-to-weight. This means that a 727 could fly lower and be less detectable than a B-1. It also means that the B-1 will have serious handling and safety problems, due to the very inadequate wing area. Is this true, and if so why are we spending billions on an aircraft that clearly will not meet our needs? Please be specific.

Answer. Low altitude terrain masking is not the only way to successfully penetrate Soviet air defenses. Reduced radar cross-section and electronic countermeasures (ECM) can also aid in defeating enemy radars.

The snyergistic combination of the B-1Bs reduced signature, advanced ECM, low altitude and high subsonic penetration speed significantly reduces Soviet detection and engagement opportunities. Based on these capabilities, we estimate the B-1B will be able to effectively penetrate anticipated Soviet defenses well into the 1990s.

Maneuverability of the B-1B has been judged by test pilots to be outstanding in all mission phases. While wing loading and thrust-to-weight ratio will change throughout a mission profile as the aircraft weight decreases due to fuel consumption, the B-1B wing loading and thrust-to-weight ratio during the penetration phase are in the high performance regime, thus enhancing its survivability.

Comparisons of one or two performance characteristics between generically different aircraft—B-1B (strategic bomber) and an F-111 A/F (dual purpose fighter) or a 727 (commercial airliner)—result in limited perspective analyses which do not address the full spectrum of relevant performance criteria.

While there are aircraft that have higher thrust-to-weight ratios and lower wing loadings than a B-1B, the characteristics by themselves are not the most important characteristics of a strategic bomber. Comparisons of strategic bomber candidates must, as a minimum, consider such characteristics as payload, range, nuclear hardness, and overall mission flexibility.

The Joint OSD/Air Force Bomber Alternatives Study, conducted an indepth comparative analysis of several strategic bomber candidates. The study concluded that the B-1B was an outstanding, cost-effective strategic bomber capable of meeting the multi-role mission mandated by Congress. The B-1B will have the capability to penetrate anticipated Soviet air defenses well into the 1990s in a multitude of employment modes and to perform effectively as a cruise missile carrier and as a conventional bomber well into the next century.

Question 8. Since the B-1's very expensive electronics are centered around emitting systems—terrain-following radar and very high power jammers—it may alert the Soviet defenses. Even if only the terrain-following radar is in use, the Soviet air defenses need not turn on their radars, since they can passively angle track the emitting B-1—at distances well beyond Soviet radar detection range. Is this true, and if so why are we proceeding with production of an aircraft that has clearly not completed research and development?

Answer. The information preceding the question is simply not true. High powered jammers are not turned on unless an enemy radar is illuminating the B-1B. When an illuminating radar is detected, the jammers are turned on to confuse, disrupt or deny the enemy radar a kill probability.

Also, for the terrain-following radar, while it is in fairly constant use, its power level (one kilowatt average) is far less than that of an air defense radar (ten kilowatts average or one Megawatt peak); therefore, the enemy radar will detect the skin return of a B-1B radar emission at line-of-sight or approximately 20 miles.

With very low RCS aircraft this would not be true, and research and development would be required. This is simply not the case for the B-1B. The B-1B has clearly completed R&D in this area.

Question 9. The USAF Independent Cost Analysis shows $30B for 100 bombers. Even this is almost certain to be exceeded by at least $5 billion, based on converting USAF 1975 internal estimates to fiscal year 1982 dollars. Is Congress being fully and fairly advised of these figures? Is this endemic to our other weapon programs regarding cost?

Answer. The 1981 B-1B USAF Independent Cost Analysis (ICA) estimate of $29.7 billion (in fiscal year 1981 dollars) for 100 B-1Bs is an estimate of 20 year life cycle cost (LCC). This LCC figure is consistent with previous Air Force estimates as it represents an estimated $9.2 billion for operating and support costs, plus the total acquisition (development and production) baseline estimate of $20.5 billion.

When adjusted for programmatic scope and content changes, cost-estimating methodology differences, and inflation, the 1976 cost estimates are comparable with the $20.5 billion total acquisition cost estimates from the 1981 B-1B ICA. We are confident that the B-1B cost and schedule analysis we have provided Congress, fully and fairly estimate the costs of the B-1B acquisition program.

The actual program cost for any system may differ from the best of estimates—sometimes higher, sometimes lower. The actual program cost of the F-16, for example, was 4 percent lower than its 1975 ICA estimate.

Question 10. Is DOD developing a competitive bomber prototype for a small, highly maneuverable bomber capable of ultra-low penetration and about 125,000 pounds rather than 450,000 pounds? It seems that such a plane with high quality passive electronics and active radar and jamming for emergency short-burst use would be significantly better and cheaper? Are they any plans for a program like this?

Answer. The Department of Defense has no plans for developing a 125,000 lb. aircraft for strategic purposes. Such a design would not have the necessary range and payload characteristics required for a long-range strategic aircraft.

While maneuverability has high payoff for tactical aircraft, strategic aircraft must rely upon factors such as: fast base escape, dispersal, low detectability and negation of defenses via either avoidance by passive means or active electronic countermeasures. These characteristics have been designed into the B-1B.

Responses to Written Questions Submitted by Senator Sasser

Question 1. Secretary Carlucci, in his memorandum, suggests Defense Department cooperation in "strengthening" the industrial base for defense hardware. My concern is whether such a cooperative relationship might lead to pressures to buy more new weapons rather than recycling older ones. For example, fewer ships might be brought out of "mothballs," even though these vessels might still adequately serve certain needs. I would like to know how Secretary Carlucci would suggest that we strike a balance on this.

Answer. Our acquisition improvement initiatives address this very point. It is our policy to pursue a product improvement or a "recycled" system if it will meet the military requirement at lower life cycle cost. Our initiatives concerned with better cost estimating will enable us to make a better comparison of new vs. improved equipment alternatives and make the correct decision. Our initiative to make Pre-Planned Product Improvement (P^3I) an integral part of the acquisiton process also mandates us to consider the feasibility and advantages of a product improvement at each milestone decision and requires modularity and growth considerations in the design to accommodate further capability and utility during the life of the system.

Question 2. In a table attached to the General Accounting Office testimony last week, I noted that 49 percent of the cost overruns in weapons systems acquisitions stem from three factors: quantity changes, engineering changes, and scheduling changes.

FIG. 1.—SAR PROGRAMS' DEVELOPMENT ESTIMATES, CURRENT ESTIMATES, CATEGORIES OF COST CHANGES AND PERCENT COST GROWTH BY SERVICE AS OF JUNE 30, 1981

[All figures in millions of then-year dollars]

Service	Development estimate	Cost changes to date in program then-year dollars								Current estimate	Percent cost growth	
		Quantity change	Engineering	Support	Schedule	Estimating	Other	Economic escalation	Total change		Adjusted for quantity	Unadjusted
Army	$30,963.4	$5,734.7	$2,029.7	$3,406.1	$4,373.5	$20,150.3	$161.7	$7,178.8	$43,034.8	$73,998.2	102	139
Navy	80,875.6	36,255.5	4,601.5	5,722.2	9,865.6	12,845.2	1,121.6	20,099.4	90,511.0	171,386.6	46	112
Air Force	32,828.9	9,464.1	3,994.4	4,750.6	8,148.5	2,178.1	1,000.9	8,161.3	37,697.9	70,526.8	67	115
Grand total	144,667.9	51,454.3	10,625.6	13,878.9	22,387.6	35,173.6	2,284.2	35,439.5	171,243.7	315,911.6	61	118
Percent of total cost changes		30	6	8	13	21	1	21	100			

Source: Selected Acquisition Reports Summary Tables as of June 30, 1981 (pp. 1 and 4 of 5) prepared by OASD (Comptroller), Aug. 14, 1981.

Some of these changes, particularly quantity changes, seem to emanate from the Defense Department itself. I would like Secretary Carlucci to tell me why we have such changes. Is it because of the highly technological nature of these weapons systems? Or, is it perhaps because of faulty decision-making at the Pentagon?

I feel that we need Secretary Carlucci's perspective on these questions because we are going to be increasing defense spending dramatically over the next several years. And many worthwhile domestic programs may fall by the wayside as a result. If we do not have an efficient weapons acquisition process, we may see a declining confidence in our capabilities to field an efficient and effective system for national defense.

Answer. The reasons for quantity changes during the acquisition of weapon systems may vary from one system to another; however, the underlying causes for these changes have been budgetary constraints which preclude the acquisition of the originally planned numbers. Examples of these are the Fighting Vehicle Systems and the Advanced Attack Helicopter. Other reasons for quantity changes include technical difficulties which make it prudent to postpone the introduction of the system, changes in the threat which require the incorporation of a redesign, and alterations in military need.

In order to alleviate these quantity changes, several steps are being taken as part of the DoD Acquisition Improvement Program. Tying together the DSARC Milestone Decisions and the Planning, Programming, and Budgeting System should assure that funds are or will be budgeted to implement the DSARC decisions. Improvements in long range planning and estimating will provide more accurate forecasts of funding requirements and where these requirements fall with respect to mission area projected resources. Additionally, deliberate changes will be made in an orderly manner through the P^{3}I initiative which will work toward minimizing the cost impact.

Question 3. There is a story in today's Washington Post that indicates that the Pentagon opposes Senate-passed legislation to tighten Department of Defense accountability for cost overruns. Now, the Pentagon has not as yet made any public statement about this provision which amends the 1982 Defense Authorization Act. Would you give me your assessment of this legislation on behalf of the Pentagon? Doesn't it head in the same direction as your initiatives on procurement?

[The article referred to follows:]

[From the Washington Post, Oct. 27, 1981]

A BILL TO CURB DEFENSE OVERRUNS STIRS OPPOSITION

(By Morton Mintz)

A Senate-passed bill to tighten Defense Department accountability for large cost overruns on major weapons systems has stirred behind-the-scenes opposition in the Pentagon and may be weakened in a House-Senate conference.

The bill says that if the cost of a weapons system, including inflation, exceeds a baseline by more than 15 percent during development or 10 percent during procurement, the Pentagon must explain the reasons to Congress within 30 days, in a report that is to include the names of the responsible officials and the plans to curb further overruns. The baseline would be the cost estimated by the Pentagon in its March 31, 1981, SAR (selected acquisition report). The SARs, which are filed quarterly, describe the current status and cost of nearly 50 major weapons systems.

The bill would bar further outlays for a system if the Pentagon's report is filed more than 30 days after its due date.

The Senate passed the bill on a lopsided 96-to-0 vote last May, as an amendment to the 1982 Defense Authorization Act, which is now in House-Senate conference. The House has adopted no similar proposal.

Officially, the Pentagon takes a noncommittal approach to the amendment, saying it "has reviewed and is in the process of working with congressional staff to make the cost reporting system more effective."

But Sen. Sam Nunn (D-Ga.), the amendment's sponsor, said in an interview yesterday that although some Pentagon representatives were negotiating changes in the amendment's terms in apparent good faith, others "were working with House staff to oppose the amendment completely."

Rep. William L. Dickinson (Ala.), a leading foe of the amendment in the House-Senate conference and the ranking Republican on the House Armed Services Committee, also acknowledged flat-out Pentagon opposition in an interview.

In addition, strong objections to the amendment were made by Defense Secretary Caspar W. Weinberger in a July 21 letter to Sen. John G. Tower (R-Tex.), chairman of the Senate Armed Services Committee. Tower, after criticizing the amendment on the Senate floor, voted for it anyway, saying, "You cannot vote against motherhood. . . ."

The Project on Military Procurement, a non-profit watchdog group, has obtained unsigned memos, apparently written in the Pentagon in June, suggesting key changes in the amendment's wording, such as excluding inflation in assessing overruns and eliminating the requirement for written explanations. A former Defense official consulted by the project said that the changes would devastate "the only recent action that actually discourages overruns."

It was only six years ago that Congress began to require the Pentagon to submit the quarterly SARs. In a 1980 report, however, the General Accounting Office said that the report omitted "important information," almost always including the original cost estimates that the Pentagon uses to sell Congress on weapons systems. Displaying an SAR on the Senate floor, Nunn said that much of it was classified, and "almost all of [it] is unintelligible."

He said the amendment is "strong action to control . . . dramatic cost growths" and would "begin to introduce Congress to the real world of defense procurement."

Amendment foe Dickinson asserted, however, that it "creates a lot more mischief than it would help." Singling out a requirement that the secretary of defense certify any increase of 25 percent or more over baseline, he asserted—but amendment supporters denied—that inflation for which the secretary bears no responsibility could cause a system to be terminated.

Both Nunn and Rep. Newt Gingrich (R-Ga.), a member of the House-Senate bipartisan Military Reform Caucus, warned that defeat of the amendment would increase congressional and public disillusionment with the Pentagon's ability to get a handle on overruns and, in the long run, would have detrimental effects on national security.

Gingrich said that if the conferees reject the amendment, he will favor a slash of several billion dollars in the 1982 defense budget. "If the Pentagon is in effect lobbying against the amendment, they are avoiding short-term problems while building long-term crises for themselves," he said.

Answer. The Post's story overlooks the many initiatives already taken by the department to solve this complex issue. Among these are closer cooperation with Congress. We see no problem in meeting Congress' legitimate demands for information, including that sought in the Nunn Amendment.

Our problem lies with certain specifics of Sen. Nunn's proposal, and this in no way implies support for cost overruns. The amendment, as currently drafted, would oblige the secretaries of the military services to report data directly to Congress, thus bypassing the secretary of defense who is accountable to Congress for weapons acquisition as well as the entire defense program. The amendment, as currently worded, is imprecise as to when certain types of information are required, stops programs automatically and fails to provide for restarting them once they are halted. This entails a loss of management control. We would like an opportunity to work with the oversight committees to develop a precise and unambiguous reporting system that is responsive to the needs of Congress.

This administration instituted a 32-point program to control overruns long before the Nunn amendment. It has already received widespread support from experts, including the General Accounting Office, who have testified before Congress.

Question 4. The Congress is being asked to commit a larger proportion of the Federal budget to defense. Yet, as far as cost estimates for major weapons systems go, we have a prime example of what I call "creative budgeting." That is, we chronically estimate low and spend high. It seems that the initial cost estimates from the Department of Defense must always be doubled before they can be considered realistic. If Congress makes the commitment to step up defense spending, then when can we expect more efficient estimates of costs by the DoD? Your efforts and your initiatives are commendable, but I would like some sort of a timetable for achieving a turnaround in the weapons acquisition process.

Answer. As much as I would like to give you a precise timetable for improving our cost estimating of major weapons systems, I cannot do so. Changing the present thinking is not a simple task. Several Deputy Secretaries of Defense preceding me have tried to improve the quality of cost estimates with only very limited success. The problem is one of changing incentives and that takes time and vigilence. I think we can do it, but the results will not be available for several years.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR LEVIN

Question 1. What studies/reviews have been made of DoD Procurement Quality Assurance Program during the past two years? Provide us with copies of these and information on the status of recommendations therein.

Answer. During the past two years there were two significant studies concerning Quality Assurance which have an impact on DoD.

1. The GAO Report entitled "Effectiveness of US Forces Can Be Increased Through Improved Weapon System Design," PSAD-81-17 was published January 29, 1981. A copy of the report, Exhibit No. 1, and the current status, Exhibit No. 2, are furnished. This report cited quality and other areas requiring improvement. Exhibit No. 2 reflects the status on recommendations for quality, reliability and testing.

2. The Defense Logistics Agency (DLA) contracted for a study of the Contract Management and Quality Assurance Functional Elements of DLA's Defense Contract Administration Service (DCAS) Component which was recently completed. Action to review the recommendations is just beginning and no targets for completion have been established at this time. A copy of the study and the Executive Summary are furnished as Exhibit No. 3 (a) and (b).[1]

[The exhibits referred to follow:]

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[1] Exhibit 3a may be found in the committee files.

BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Effectiveness Of U.S. Forces Can Be Increased Through Improved Weapon System Design

Many of today's military systems cannot be adequately operated, maintained, or supported because the Department of Defense does not pay enough attention to logistic support, human factors, and quality assurance during the design phase of the acquisition process. These problems deter the systems' effectiveness to defend our country in case of war.

GAO therefore makes recommendations to improve the management and planning of ownership considerations that have an impact on the effectiveness of a weapon system.

UNITED STATES GENERAL ACCOUNTING OFFICE

PSAD-81-17
JANUARY 29, 1981

553?

EXHIBIT #1

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-201505

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses weaknesses in the Department of Defense's major system acquisition process which are contributing to the operation, maintenance, and support problems of many deployed weapon systems. We consider the message of this report to be particularly important considering the problems our Armed Forces are having with weapon systems.

This review was undertaken in an effort to identify changes which are needed in the acquisition process to minimize problems with future weapon systems.

Copies of this report are being sent to the Director, Office of Management and Budget, and to the Secretaries of Defense, Army, Navy, and Air Force.

Elmer B. Staats
Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

EFFECTIVENESS OF U.S. FORCES CAN BE INCREASED THROUGH IMPROVED WEAPON SYSTEM DESIGN

DIGEST

The United States' ability to fight a war may be severely hampered because many of the aircraft, ships, tanks, ordnance, and other systems the Armed Forces must use are suffering from numerous problems. While these systems may have the capability to perform their missions, it is often of little value because not all the systems can be adequately operated, maintained, or supported.

GAO has reported on these problems in the past and believes that many of them can be traced to the Department of Defense's (DOD's) system acquisition process, particularly the early phases before system design is set. The pressures to attain specific performance goals, such as speed, range, and firepower, within tight time and cost constraints have often led management to trade-off or otherwise not give adequate attention to long term "ownership considerations."

GAO examined three ownership considerations which appear to be among the most prominent detractors from the effectiveness of deployed systems--logistic support, human factors, and quality assurance. DOD has made changes to direct more attention to these three factors, but GAO believes that several additional actions need to be taken if these considerations are to receive adequate emphasis in the design of military systems and equipment. These actions will have to include greater support by the Congress and DOD for activities, such as logistics and human factors research, testing, and analysis.

Tear Sheet. Upon removal, the report cover date should be noted hereon.

LOGISTIC SUPPORT

Logistic support requirements, such as replacement parts, tools, test equipment, technical manuals and facilities, and the time and cost of providing these, are not being adequately addressed when designing systems and equipment. This contributes to low system readiness rates when deployed because the military supply and maintenance systems cannot meet the demands placed on them.

DOD is now placing greater emphasis on logistic support requirements during the acquisition process, including adopting a policy that supportability is as important as cost, schedule, and performance. The positive impact these changes need to have may never fully materialize because:

--The process for interfacing logistic considerations with other design considerations--logistic support analysis--is very difficult to do. Much of the data needed for design decisions is difficult to obtain; there is a shortage of trained people to do the analysis; and the analysis can be costly, especially if duplicative analyses are not eliminated. (See pp. 22 and 23.)

--The quantitative analysis needed to assess logistic plans, resources, and support-related parameters for meeting system readiness goals may be very difficult to perform because the analytical models for making such assessments may not be adequate. (See p. 23.)

--There is very little guidance to ensure that critical program documents contain the language needed to get systems designed that are supportable. (See p. 24.)

--Testing a system's supportability before it is deployed is difficult to do, requires dedicated test time and articles, and is expensive. (See pp. 24 and 25.)

--There is little incentive for management to either invest development funds or to trade-off technical performance to improve the supportability of a system because it is very difficult to quantify the benefits of such investments and trade-offs. (See p. 25.)

HUMAN FACTORS

Limitations such as skill levels, proficiency, availability, environmental stress, and fatigue of the personnel who operate and maintain military systems contribute to human-induced system failures. Indications are that these types of failures are quite high. New policy emphasis on human limitations in the design of systems may have a very limited impact because:

--Human factor specifications, standards, and handbooks used in designing and developing systems and equipment do not adequately address human limitations. (See p. 31.)

--There are no common methodologies and data sources for use by system designers in forecasting skill levels of future military personnel. (See pp. 31 and 32.)

--DOD testing policies and procedures do not tend to identify and resolve potential human-induced failures during the developmental stages of the acquisition process. (See pp. 32 and 33.)

QUALITY ASSURANCE

Systems being deployed are not as reliable as they are intended to be. Part of the problem is that the reliability inherent in system designs is being lost in the transition from design to production and deployment.

The extent of the problem is very difficult to quantify, but its existence points up the need for designing systems which can be manufactured to the tolerances called for in the specifications and then tested to confirm compliance. DOD recognizes the problem, but attempts to place greater emphasis on designing these types of features into systems are hampered because:

--There is a lack of guidance to project managers on how to evaluate designs for quality assurance. Part of the problem may be that there is only one person in the Office of the Secretary of Defense assigned to the policy aspects of quality assurance. (See p. 38.)

--Files on contractor quality histories have not been fully established and the cross-service product quality deficiency reporting requirement has not been fully implemented. (See p. 38.)

--Government engineers with adequate training in quality assurance are in short supply. (See p. 39.)

RECOMMENDATION TO THE CONGRESS

GAO recommends that the Congress direct more attention during its deliberations on DOD's budget to such matters as logistic support, human factors, and quality assurance considerations in the design and development of weapon systems.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

Logistic support

GAO recommends that the Secretary of Defense

--develop new or modify current data reporting procedures to provide the information needed for performing logistic support analyses,

--establish logistic support research and study programs to develop improved quantitative assessment methods (see p. 26),

--provide detailed guidance to ensure that critical program documents contain the language needed to obtain systems which are supportable, and

--provide for improved testing and evaluation of the supportability of systems before they are deployed.

Human factors

GAO recommends that the Secretary of Defense

--modify human factor specifications, standards, and handbooks used in system design so that they adequately address all human limitations which can result in human-induced system failures,

--develop common methodologies and data sources for use by system designers in forecasting skill levels of military personnel 5 to 10 years in the future, and

--ensure that all major systems are subjected to adequate testing and examination from a human factors standpoint throughout the acquisition process, particularly in the developmental stages.

Quality assurance

GAO recommends that the Secretary of Defense

--produce comprehensive guidance for program managers as to how a design should be evaluated for quality assurance,

--ensure that the quality history files on contractors are fully established and that the cross-service quality deficiency reporting requirement is fully implemented, and

--strengthen the quality assurance work force so as to permit their active involvement in the design phase of the acquisition process.

AGENCY COMMENTS

DOD agreed with GAO's findings, conclusions, and recommendations. (See app. III.) Changes were made to the report, where appropriate, to reflect specific comments.

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DIGEST i

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ABBREVIATIONS

DOD	Department of Defense
DSARC	Defense Systems Acquisition Review Council
GAO	General Accounting Office
ILS	integrated logistic support

ABBREVIATIONS

IOC	initial operational capability
LSA	logistic support analysis
MENS	Mission Element Need Statement
MK	Mark
OSD	Office of the Secretary of Defense
TOW	Tube-launched, Optically-Tracked, Wire Command Link

CHAPTER 1

INTRODUCTION

Each year the Department of Defense (DOD) spends billions of dollars to research, design, develop, produce, and support major weapon systems. The process for acquiring these systems is extremely complicated and influenced by a host of factors (in addition to technical performance and acquisition cost and schedule) that affect the effectiveness of a weapon system. These include:

Survivability
Vulnerability
Operational suitability
Transportability
Availability
Interoperability

Supportability
Compatibility
Reliability
Maintainability
Durability
Quality

These factors called "ownership considerations" must be balanced during the acquisition process by the program manager in an endless juggling act to acquire a system which meets mission requirements within program acquisition cost and schedule constraints.

Many of the problems being experienced with the operation, maintenance, and support of weapon systems can be related back to the extent to which ownership considerations were a factor in the early acquisition process. This report focuses on the things that must be done to give some of these considerations more weight in the acquisition process balancing act.

Within the past few years DOD has revised policies, issued guidance, and made organizational changes designed to elevate ownership considerations to a higher level of attention throughout the acquisition process. Some of DOD's actions are very recent, and their impact remains to be seen.

OBJECTIVES, SCOPE, AND METHODOLOGY

Because of the concern expressed by many military and other observers over the combat readiness of U.S. Armed Forces, we initiated this review to (1) identify some of the more prominent causes of problems with acquiring and fielding major weapon systems and (2) recommend some meaningful actions to reduce problems with deployed systems in the future. We were specifically concerned with identifying weaknesses in the acquisition process which were contributing to the deployment of weapon systems which are difficult to operate, maintain, and support. The review was not intended to provide an indepth examination of the entire acquisition process, but rather to focus on those areas of the process which we believe offer significant opportunity for improvement.

This review included visits to many locations in the United States and Europe. (See app. I for the list of locations visited.)

We approached this job as follows:

--Through research and visits to users, weapon systems were selected for review which exhibited problems that we believed:

1. Were mission significant.

2. Might have been prevented or anticipated during the acquisition cycle.

3. Were being experienced by more than one piece of equipment of the same type.

4. Could be researched because information would probably still be available on acquisition process decisions.

--These problems were traced back into the acquisition cycle to determine root causes and the trade-off decision which led to these causes.

--We were able to determine most problem causes. All of the causes fell into several broad categories, and all seemed to involve inadequate attention to ownership consideration in weapon system design. Three major early design phase considerations were selected for further work.

--A detailed review into the areas of logistic support, human factors, and quality assurance was conducted with emphasis placed on how these ownership considerations are addressed in the early phases of the acquisition cycle (mainly between milestones 0 and I). Much of the information was obtained through discussions with DOD and industry representatives involved with the acquisition of weapon systems.

--Improvements to the acquisition cycle were postulated to hopefully alleviate similar problems in the future.

Our office has issued numerous reports that relate to readiness, logistic support, military personnel, the DOD acquisition process, and other matters discussed in this report. For a listing of some of the most relevant reports issued since January 1979, see appendix II. A February 1979 DOD study, "Defense Resource Management Study," also reported on some of the issues discussed in this report. The study report recommended increased emphasis on ownership considerations in the acquisition process and identification and application of innovative support concepts for new systems being developed.

COMMENTS OF OUR PROCUREMENT ADVISORY PANEL

A draft of this report was submitted for review and comment to 18 members of our Procurement Advisory Panel. The Panel is comprised of top management officials from industry and the academic community. Changes were made to the report, where appropriate, to reflect their comments. They fully support the need for more emphasis on ownership considerations in the design of weapon systems but are concerned that the funds needed to bring about the desired improvements may not be provided, particularly considering the national problem of funding an adequate DOD program. A summary of other key comments made by Panel members is included in appendix IV.

CHAPTER 2

HIGHLY SOPHISTICATED WEAPON SYSTEMS MUST BE DESIGNED WITH USERS IN MIND

America's leadership in technology is decades old and this technology has provided truly advanced defense systems. Technology has also introduced new challenges to weapon system designers to assure that the readiness of our forces is maintained at high levels. All the design participants, however, have not kept pace. A tank hatch that a soldier, clothed for winter, cannot fit through; a major shipboard fire control system that cannot be adequately supported; aircraft test equipment that causes more problems than it solves; and a handheld missile that when fired startles the person that fires it, resulting in misses, are some examples of the problems with currently fielded weapon systems. However, it is difficult to pinpoint the degree to which system effectiveness has been impaired due to lack of attention to system designs and ownership considerations. What is needed is a more balanced approach in designing weapon systems which gives full and adequate attention to ownership considerations.

Although increased policy emphasis has recently been given to ownership considerations, the effect will be meaningless unless new policies are properly implemented. We believe there are three important ownership factors in the acquisition process which recent history suggests are among the most prominent detractors from the effectiveness of deployed systems--logistic support, human reliability, and quality assurance. Our selection of these ownership factors for analysis does not imply that others are unimportant. Rather, we suggest that there has been an imbalance of funding and attention given between the measurable characteristics of weapon system development (cost, schedule, and performance) and these other factors which significantly influence the eventual effectiveness of the system in the field.

COMPLEXITY/SOPHISTICATION

The terms complexity and sophistication in relationship to weapon systems are in themselves something of an enigma. We did not find any formal definition of these terms within DOD nor did we find a finite technique for quantifying system complexity or sophistication. What is complex/sophisticated to the operator or the maintenance crew of tanks may not be for the engineers who designed and fabricated the tank, or to the program manager who managed the development effort.

In our attempts to establish the relationship between the terms "complexity/sophistication" and the operational availability of military systems, we identified many types of military equipment which were reported to be undependable and/or difficult to support and operate. These vary from simple infantry entrenching tools (for example, shovels) which did not fit in their carrying pouches, through boilers which could not be properly maintained, to aircraft avionics that failed because of software program deficiencies. (For examples, see app. V.)

Some people measure complexity by the number of component parts while others allude to the relationship and interdependencies of various components and/or subsystems. Some understand sophistication to mean the state-of-the-art status of a component. Others use sophistication interchangeably with complexity.

We believe that in defining the terms complexity/sophistication in relation to weapon systems one must include such factors as logistical support, human factors, quality assurance, and even the conditions under which hardware must be employed (for example, day versus night time).

TECHNOLOGY IS A DRIVING FORCE

The demand for high performance has forced designers to incorporate new technology into systems often before its reliability has been fully assessed. On the design table reliability is sometimes compromised in favor of performance and cost. When this happens, the cost in field repairs and low system readiness rates can be high.

In the commercial sector, firms tend to rely on evolutionary product improvements. Quantum changes occur only when technology advances have been proven. Product improvements are generally made to correct specific problems in the design or manufacturing process, and the impact of these changes on reliability and quality are evaluated. They recognize that design is an iterative process and seldom, if ever, will they produce a perfect design the first time, even though they incorporate all currently known techniques.

In contrast, DOD tends to push state-of-the-art advances in many areas simultaneously. We can see examples of this in major subassemblies of systems, such as the automatic test equipment on the F-15; the Tube-launched, Optically-Tracked, Wire Command Link (TOW) Missile System on the COBRA helicopter; the Mark (MK)-86 Fire Control System on Navy ships; and the turret of the M60A2 tank. Specifically:

--The F-15 relies on intricate electronics to survive and effectively accomplish its mission. In our review we examined the automatic test equipment used to support the F-15, since this is known to affect the aircraft's poor readiness. The software used in three different levels of equipment was incompatible and the built-in test and avionics intermediate shop equipment was unreliable. Without modifications, it seems doubtful that the F-15 fleet readiness can appreciably improve. This is compounded by the well-publicized F-15 engine reliability and durability problems. (See our report, "Are Management Problems In the Acquisition of Aircraft Gas Turbine Engines Being Corrected?," PSAD-80-72, Sept. 30, 1980, which attributes the engine problems to inadequate definition of the engine's usage, emphasis on performance requirements, and inadequate flight testing.)

--The Army's only deployed attack helicopter, the AH-1 "COBRA," has a serious maintainability/reliability problem according to users in deployed Army units. One of the helicopter's primary missions is killing tanks using its TOW missile system. The subsystem used in launching and guiding the TOW missiles is experiencing only about 100 hours mean time between failure of critical mission-related components. The root cause of these failures is attributable to the poor reliability of various electronic modules and the system's built-in test equipment.

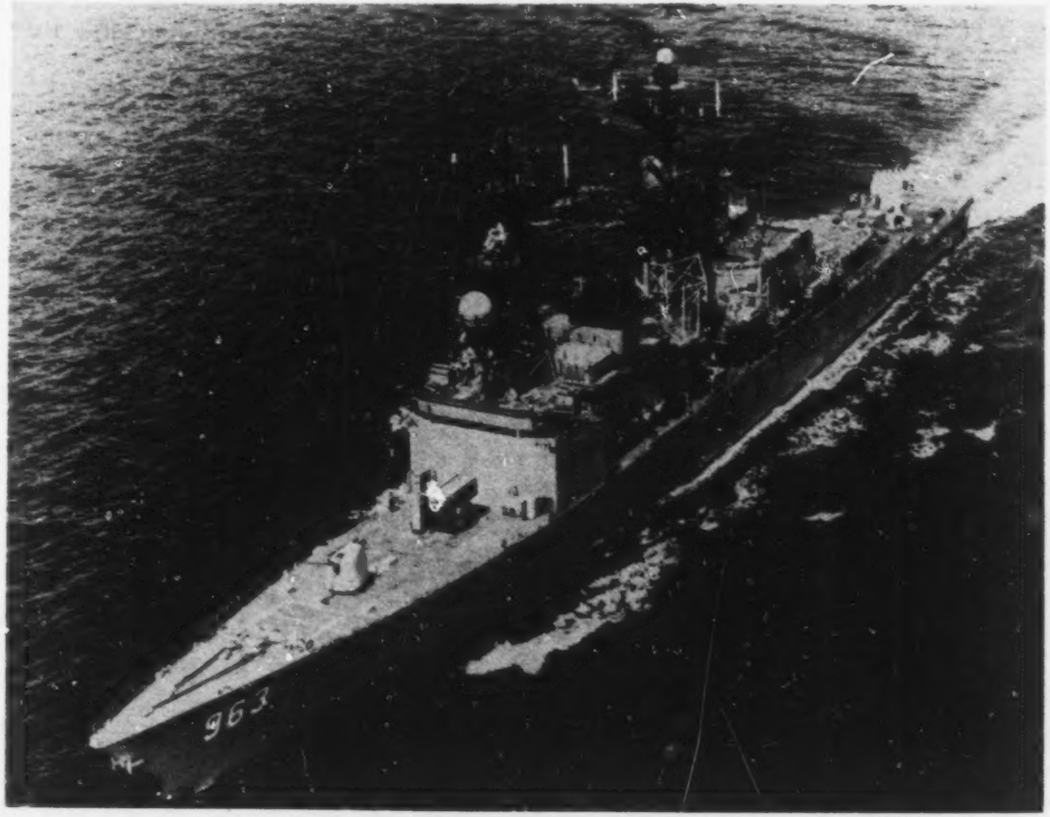
--The Navy's MK-86 fire control system is the primary weapon's control aboard the most advanced combat ships, providing multiple modes of operation and simultaneous tracking of more than one target. It is important to note that when the system is inoperable, the ship is virtually defenseless. In 1979 the system experienced an operational availability rate of only about 60 percent despite special supply support efforts. The primary reasons for this low availability was the large number of random failures among the 40,000 plus parts in the system and the extreme difficulties of the supply system to stock sufficient quantities of replacement components to meet the demands in a timely manner. Also, there is a long learning curve for repair technicians because of the system's complexity.

THE AIR FORCE'S F–15 AIRCRAFT HAS EXPERIENCED EXTENSIVE PROBLEMS WITH BOTH ITS AUTOMATIC TEST EQUIPMENT AND ITS ENGINES

SOURCE: DEPARTMENT OF THE AIR FORCE

THE ARMY'S AH–1 HELICOPTER HAS EQUIPMENT RELIABILITY PROBLEMS WHICH IMPACT ITS ABILITY TO FIRE ITS MISSILES

SOURCE: U.S. DEPARTMENT OF THE ARMY



OVER 40 U.S. NAVY WARSHIPS LIKE THE U.S.S. SPRUANCE (DD–963) ARE EQUIPPED WITH THE MK–86 WEAPONS CONTROL SYSTEM, WHICH IS OFTEN NOT OPERATIONAL

SOURCE: DEPARTMENT OF THE NAVY

--The Army's M60A2 tank can fire either a 152-mm. projectile or a missile through the same tube. The turret on this tank has been described by one M60A2 unit commander as "fantastically complex." The tank has a long history of unreliability. Operation of the tank is so difficult that one organization in Europe has printed a detailed checklist of sequential actions to be accomplished by the crew before driving and firing the weapon. We examined one subsystem of the turret, specifically the laser rangefinder, and found electronic reliability problems.

A comment by General Bernard W. Rogers, former Chief of Staff, U.S. Army, before the Senate Armed Services Committee in the fiscal year 1980 hearings succinctly describes the situation we see.

> "Constant striving to achieve technological excellence is causing undue technical complexity, leading to high cost and long gestation. Worse, we have come to assume in this country that increases in military performance come only from technology and that the purpose of technology is to improve upon the various physical characteristics of familiar weapon systems. The result is a failure to anticipate shifts in military requirements, aggravated by long gestation periods in weapons development."

Dr. William J. Perry, Under Secretary of Defense for Research and Engineering, also recognizes an overreliance on technology. In his statement before the Senate Armed Services Committee on March 14, 1979, he stated that a dangerous communications gap has developed between the developer of systems and the user. This gap has led to systems that are largely technology driven and are poorly united to the operational need because the user did not know how to state his need in terms of the available technology. He also stated that DOD research and development programs have applied technology to enhance performance without adequate considerations of its impact on the user in terms of support costs and the number of skill levels of U.S. military personnel. The results, according to Dr. Perry, have been visible in a number of operating systems with low readiness and the need for expensive retrofits and modifications.

Private industry perceives problems with DOD's approach

General Rogers and Dr. Perry's concern about DOD's over-reliance on technology is not without foundation. In our discussions with representatives of major defense contractors, we surfaced several professional opinions that reflect upon the life-cycle reliability of military systems. These opinions indicate that DOD does practice the philosophy expressed by General Rogers. Two of the major points raised by industry follow.

--DOD tries to incorporate too many "unproven" technical approaches in new systems. We were told that a single state-of-the-art component or subassembly in a new system might be feasible in that it could be watched and helped to mature. However, multiple state-of-the-art innovations are not practical because they cannot be adequately monitored and fixed and normally tend to produce an unreliable system.

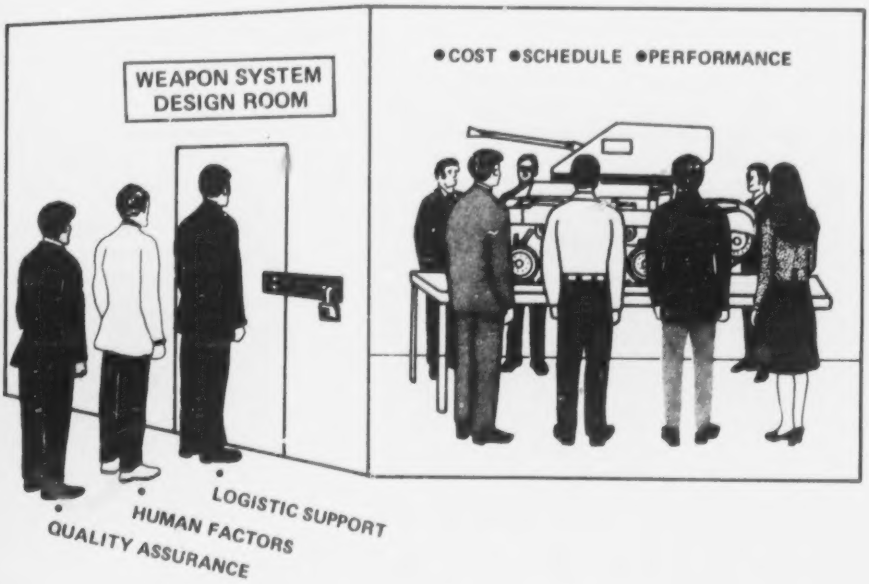
--The common approach used by DOD and the defense industry to compensate for poor human aptitudes, inadequate training, and reduced numbers of personnel is to incorporate more automation. In effect, the reliance upon man is being phased out of a system by using built-in test equipment; removable/replaceable modules; and more reliance on returning modules for factory, depot/general, support-type repair (as opposed to diagnosis and repair at military units). This approach leads to rather complex electronic components and can increase the number of "black boxes" needed in the supply system to keep a system operational.

MAINTAINING THE BALANCE

In the following chapters we will discuss some of the changes necessary in the early design phase of an acquisition (for example, logistics, human factors, and quality that must become critical design considerations). In the past this has not generally been the case. In fact, we were told that for years these considerations have been essentially "locked out" of the design process. (See p. 12.) The pressures to attain specific performance goals within tight time and development cost constraints have led management to trade-off or otherwise sacrifice the ownership considerations to meet short term budget and schedule pressures. This must change if we are to have more effective systems.

Of equal importance, however, is what happens throughout the entire acquisition process to the implementation of these considerations by management under the pressures of a rapidly changing weapon system program. The program manager is constantly being confronted by the need to make trade-off decisions that affect the high visibility aspects of a program. In this environment, ownership considerations can easily be traded-off for short term solutions which favor those high visibility aspects. No matter how well the ownership factors have been designed into a system, they will not be fully effective unless management is motivated to better ensure their consideration during the entire process.

FIGURE I


WEAPON SYSTEM DESIGN ROOM
●COST ●SCHEDULE ●PERFORMANCE
● LOGISTIC SUPPORT
● HUMAN FACTORS
● QUALITY ASSURANCE

To help all levels of management give greater emphasis in their thinking toward the ownership considerations, it might be necessary to change the way in which the procurement community thinks about cost (research and development, procurement, and support), schedule (initial operational capability (IOC)), and performance (speed, weight, firepower, and so forth). For example, cost should be the life-cycle cost of an acquisition, schedule should be the time when a fully supportable system is fielded, and performance should be a measure of a system's readiness to do the job for which it was designed.

RECOMMENDATION TO THE CONGRESS

The Congress can significantly influence the direction DOD takes regarding developing weapon systems which are operable, maintainable, and supportable. In view of the problems being experienced with deployed weapon systems and questions concerning the readiness of our Armed Forces, it is particularly important that such emphasis be exerted now. Accordingly, we recommend that the Congress direct more attention during its deliberations on DOD's budget to such matters as logistic support, human factors, and quality assurance considerations in the design and development of weapon systems.

CHAPTER 3

LOGISTIC SUPPORT--A

VITAL DESIGN CONSIDERATION NOT ADEQUATELY ADDRESSED

> "* * * Past Defense Reports have emphasized unreliable and hard-to-support equipment designs as a major, and often the principal, contributor to less-than-desirable weapon system performance in the field."

These words from the Secretary of Defense's annual report for fiscal year 1980 highlight both the need for designing logistic support into military systems and the failure to satisfy that need. DOD has been trying to implement some changes in the acquisition process to address this situation and bring the process more into balance with its needs. There are, however, many problems to be overcome which could severely curtail the positive impact that these policy changes need to have. These problems include: (1) difficulties in doing logistic support analyses (LSA), (2) difficulties in doing quantitative analyses for projecting readiness rates of various system designs and for justifying system design investments and trade-offs to improve logistic supportability, (3) lack of guidance on addressing logistic support requirements in critical program documents, (4) insufficient evaluation and testing of the integrated logistic support (ILS) planning and logistic supportability of systems, and (5) a complacent attitude on the part of decisionmakers.

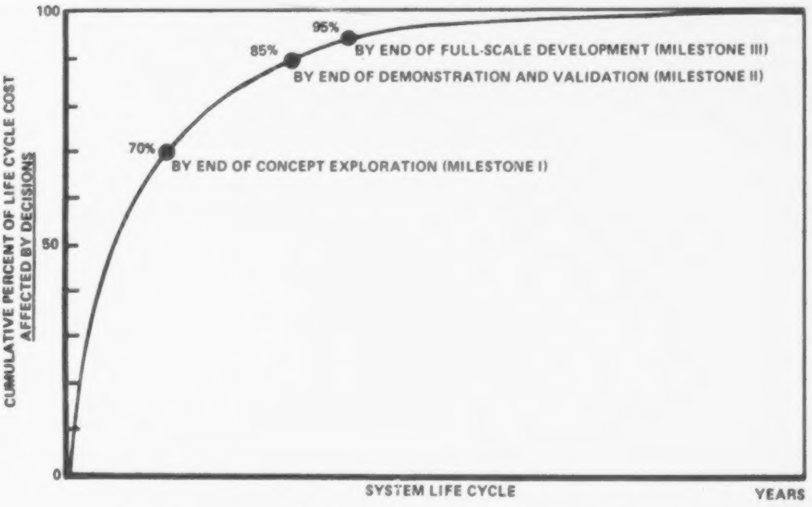
LOGISTIC SUPPORT CONSIDERATIONS MUST INFLUENCE DESIGN

Logistic support and the planning for it need to be serious considerations in the design, development, and production of defense systems. All systems depend upon logistic support to create and sustain their effectiveness. The design capability of a system can only be realized if the parts, tools, test equipment, personnel, facilities, fuel, and so forth (that is, logistic support) are available when needed. The cost of providing this support for a system often exceeds the development and procurement costs. The high cost of support can be seen in the fiscal year 1981 DOD budget requests with about $60 billion--37 percent of the total budget--programed for logistics.

To acquire a weapon system which can be effectively and economically supported, there must be continuing interactions between the logistician and the design engineer throughout the acquisition process. This is particularly important during the early phases of design where the stage is set for the bulk of a system's life-cycle costs. Many studies of life-cycle and weapon system supportability show that most of a system's life-cycle costs are determined during formulation of concepts prior to milestone I of the weapon system acquisition process. (See fig. 2.)

FIGURE 2

SCHEDULE OF DECISIONS AFFECTING LIFE CYCLE COST



SOURCE: Proceedings from National Security Industrial Association Symposium on Navy Systems Acquisition, October 27-28, 1977

Impact of not considering logistic support in design

Some acquisition experts consider the above percentages to be quite high and possibly misleading. They point out that decisions made after milestone II are vitally important in determining the supportability of a system and should not be underestimated. Nevertheless, we found near universal agreement that the decisions made in the early stages of the acquisition process offer the greatest opportunity to influence a system's supportability. It is during this time that recognition of the consequences of the design on availability and supportability can lead to inexpensive changes to the design and improve eventual operational availability and supportability. As development proceeds and the design becomes more set, changes to improve supportability become more difficult and costly to make. Figure 3 from Military Standard 1388, "Logistic Support Analysis," illustrates our point.

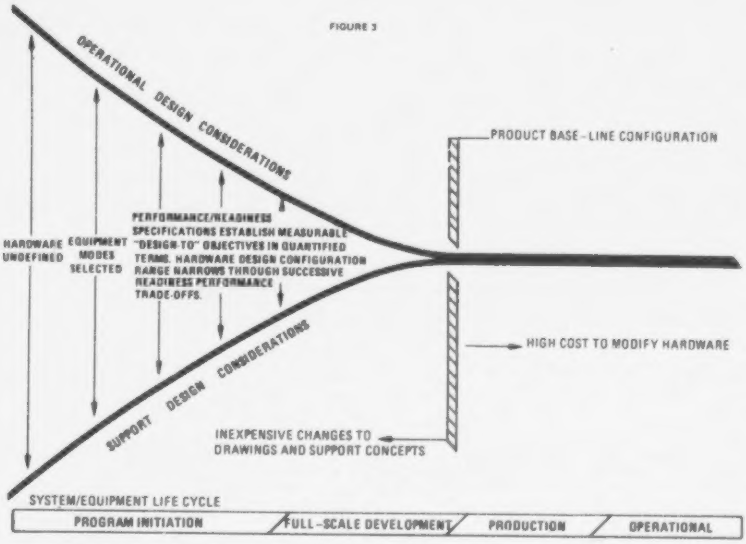


FIGURE 3

OPERATIONAL DESIGN CONSIDERATIONS
PRODUCT BASE-LINE CONFIGURATION
HARDWARE UNDEFINED
EQUIPMENT MODES SELECTED
PERFORMANCE/READINESS SPECIFICATIONS ESTABLISH MEASURABLE "DESIGN-TO" OBJECTIVES IN QUANTIFIED TERMS. HARDWARE DESIGN CONFIGURATION RANGE NARROWS THROUGH SUCCESSIVE READINESS PERFORMANCE TRADE-OFFS.
HIGH COST TO MODIFY HARDWARE
SUPPORT DESIGN CONSIDERATIONS
INEXPENSIVE CHANGES TO DRAWINGS AND SUPPORT CONCEPTS
SYSTEM/EQUIPMENT LIFE CYCLE
PROGRAM INITIATION
FULL-SCALE DEVELOPMENT
PRODUCTION
OPERATIONAL

Use of LSA in design

To promote early and continuing involvement between the design engineer and the logistician, a process known as LSA has been established. The purpose of the LSA process is to inject support criteria into weapon system designs and acquisitions and to define overall system support requirements. LSAs are to be done by the contractor and the effects of alternative designs are to be considered. Known scarcities, constraints, or logistics risks are to be identified and methods for overcoming or minimizing these problems developed. As the program progresses and designs become fixed, the LSA process concentrates on providing timely, valid data for all areas of logistic support (for example, maintenance, provisioning, personnel and training, and technical publications).

IN THE PAST--LOGISTIC SUPPORT SUFFERED FROM INATTENTION IN DESIGN

Since 1964 DOD policy directives have formally recognized the need to give attention to logistic support requirements throughout the acquisition process. In the intervening years, however, the approach to designing supportable systems has consisted principally of specific isolated efforts or analyses, not the systematic comprehensive approach of the LSA process. In fact, the LSA process has rarely been initiated in the design stages of system development as intended and, thus, has had little or no effect on system design.

When logistic support is not adequately addressed in the design process, the systems often suffer from low states of readiness when deployed because the military supply and maintenance systems cannot satisfactorily meet the weapon system's repair needs. We found numerous examples of this including the Army's Forward Area Alerting Radar System and the Navy's MK-86 Fire Control System. In each case, the logistic supportability of the design did not receive adequate review with the radar not being subjected to a logistic demonstration test and the fire control system not being subjected to a maintenance engineering analysis. These are critical steps in the acquisition process to ensure the logistic supportability of the design. Both systems have since encountered supportability problems that can be traced to the inadequate design evaluation.

Several interrelated factors have been cited as reasons for logistic support considerations having little impact on equipment design. Principally, as discussed in chapter 2, the problem has been that the acquisition process has focused on achieving technical performance parameters (speed, range, firepower, and so forth) within tight acquisition cost and schedule constraints with logistic supportability being a "consideration." Two important contributors to this situation have been the difficulties in doing LSAs in the design stage and difficulties in quantifying the benefits of logistic support design features.

Difficulties getting data needed to conduct LSAs

The design stage of the acquisition cycle is characterized by change upon change as the engineers attempt to produce designs which meet many requirements. Because of this dynamic state, the LSA process is often difficult to initiate in the very early stages of design. Also, one of the most important LSA tasks in these early stages is to review historical data to relate past experiences to the design requirements of new acquisitions. Information such as failure rates, major support cost drivers, and repair time on like or similar items is to be used to provide a basis for establishing qualitative and quantitative requirements on new equipment. We found that information of this nature has been very difficult to obtain. Existing DOD maintenance data reporting systems do not contain the information needed and, thus, special efforts must be initiated to get it.

Difficulties quantifying benefits

It is very difficult to quantify the benefits of design features which improve the logistic supportability of a system. Without such quantification, there is little motivation for the program manager and contractor to raise development/production costs by a "known" amount to save an "unknown" amount of money in future support costs.

THE PRESENT--DOD IS ATTEMPTING TO EMPHASIZE LOGISTIC SUPPORT

DOD has responded to this need by more clearly defining and emphasizing the role of logistic support in acquiring defense systems. Current initiatives include

- --revising DOD acquisition policies,
- --giving more visibility to logistics matters during Defense Systems Acquisition Review Council (DSARC) 1/ meetings,
- --improving the supportability of systems through early test and evaluation, and
- --giving additional attention to logistic matters by the services.

Considering past problems associated with obtaining the necessary visibility for logistics support considerations, these current initiatives represent a major step forward.

1/DSARC serves as an advisory body to the Secretary of Defense on the acquisition of major defense system programs and related policies and provides him with supporting information and recommendations when decisions are necessary.

Office of the Secretary of Defense policy efforts to improve logistic planning

The DOD Directive 5000.1, "Major System Acquisitions," and DOD Instruction 5000.2, "Major System Acquisition Procedures," were revised in March 1980. The DOD Directive 4100.35 concerning development of integrated logistics support programs was also revised and reissued in January 1980 as DOD Directive 5000.39, "Acquisition and Management of Integrated Logistic Support for Systems and Equipment." The revised policies stress the importance of logistic support in designing new systems and the need for logistic support planning very early in the acquisition process.

From a design standpoint, the DOD Directive 5000.1 emphasizes that logistic supportability is to be a design requirement as important as cost, schedule, and performance. Continuous interface between the program office and the manpower and logistics communities is to be maintained throughout the acquisition cycle. This is a major change from past policy, which usually subjugated logistic support to performance, schedule, and cost.

Whereas DOD Directive 5000.1 places increased importance on logistic support in the acquisition process, DOD Instruction 5000.2 generally establishes how this is to be accomplished. Early attention to logistic support begins at milestone 0 with the establishment of logistic constraints in the Mission Element Need Statement (MENS). The intent of the MENS process is to identify needs and then explore possible alternative solutions. The important consideration from the support viewpoint is that MENS presents an opportunity to influence the alternative selected from the very beginning.

In addition to including logistics constraints in MENS, DOD Instruction 5000.2 addresses other key actions designed to further emphasize supportability and influence system design. Beginning early in the system development process, both DOD and industry should consider innovative manpower and support concepts. When competitively obtaining alternative concept solutions to mission needs, the widest possible range of acquisition and support alternatives to satisfy the mission need is to be considered. Furthermore, readiness problems and support cost drivers of current systems are to be analyzed to identify potential areas of improvement to be addressed during concept formulation.

Directive 5000.39 reemphasizes the need for an ILS program that begins at milestone 0. To do this, the directive requires that program budgets include adequate funding for ILS planning, analysis, and cost reduction efforts. The ILS planning must be based on the constraints identified at milestone 0, the deployment concept, system readiness objectives, realistic maintenance, related reliability and maintainability estimates, and the documented LSA. Of particular note here is the importance given to LSA in ILS planning. For the first time, LSA is a requirement and is to begin at milestone 0.

Other major points in DOD 5000.39 include the use of ILS goals and objectives in acquisition strategic planning and contract incentives; the establishment of additional ILS research and study programs; and a clear "audit trail" of changes in support budgets, support related goals, and thresholds including changes in definition. Also, industry innovation in support alternatives is encouraged.

Attention to logistics matters by DSARC

The revised policies require the preparation of more detailed logistic support information for DSARC reviews and describe the logistic support activities which should be accomplished before each major milestone decision.

The composition of DSARC also provides some assurance that logistics factors will be addressed. The Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) is a permanent member of DSARC and is responsible for ensuring that logistic planning is consistent with system hardware parameters, logistic policies, and readiness objectives. Assisting in this effort is the ILS Analysis Division which reviews major acquisition programs from a logistic management standpoint as they become available for DSARC review. One of the primary assessments made is a quantitative analysis to project system readiness levels.

Testing for logistic support

In March 1979 DOD initiated a two-phased study of the weapon system test and evaluation process related to operational suitability, including logistic supportability.

The first phase of the study effort found that the requirement to evaluate operational suitability is well established in top level policy directives. However, guidelines for implementation do not exist in any consolidated form, nor does existing DOD documentation clearly state to what extent operational suitability will be addressed at each phase of the program.

The study further observed that the assessment of system operational suitability, under any conditions, is a complex undertaking. A number of factors and conditions were also identified which make the process more difficult and demanding. Some of the problems center around test hardware immaturity, lack of representative support and test equipment, nonrepresentative training, artificial test environments, and the complex nature of weapon systems and their supporting logistics systems.

In addition to these inherent technical problems, many development programs have been compressed to meet tight and concurrent schedule objectives. As a result, the time allotted for testing to evaluate the supportability characteristics of systems in development is often inadequate. The second phase of the study is addressing the need for revisions to current testing policies and procedures.

Attention to logistics matters by the services

The services have undertaken several initiatives to ensure the consideration of logistic support factors in the acquisition cycle. Two of these initiatives are (1) establishment of groups to review the status of logistic support planning for ongoing programs and (2) emphasis on implementing LSAs.

Logistic review groups

Each service has an extensive system acquisition review process. This process extends from the project office level up to and including the office of individual service secretaries. Although logistic support planning is addressed during these various levels of review, the services recently established individual logistic review groups in an attempt to give some additional attention to logistics considerations during the acquisition process. The ability of these groups to affect an individual program's logistics effort varies from service to service.

Additional attention being given to LSA

Groups specializing in applying LSA have been established in each of the services. These groups are available to assist project offices, upon request, with developing and implementing the LSA process in their respective programs.

Another indication of the emphasis being placed on LSA is the establishment of an unofficial joint service LSA working group in late 1978. At this time the logistic establishments of all three services and the Marine Corps met to discuss the status of LSA implementation. It was decided a joint service effort would be initiated to develop a common basis for LSA implementation.

Since that time industry representatives have joined the group and a joint service memorandum of understanding has been signed. The memorandum of understanding defines how the services will work together to increase LSA's effectiveness. As a result, the Office of the Secretary of Defense (OSD) has recently agreed to formalize the working group and take the lead in directing its efforts. One of the first projects to be undertaken is the updating of Military Standard 1388. This is being done to (1) meet today's system engineering requirements, (2) more clearly explain the tailoring of the LSA process, and (3) assist in making LSA task statements more explicit.

THE FUTURE--WILL THE SYSTEMS DEPLOYED BE SUPPORTABLE?

While most everyone we interviewed was pleased with the new policies, many were also skeptical about whether the policies will be implemented. We share their concern. The problems which will make it difficult to satisfactorily implement the new policies include

--difficulties in doing LSAs,

--difficulties in projecting readiness rates,

--inadequate guidance, particularly on LSA,

--insufficient evaluation and testing, and

--potentially complacent attitudes on the part of decisionmakers.

Difficulties in doing LSAs

The three key difficulties to having an effective LSA program starting at milestone 0 are (1) getting the information needed to start analyses, (2) getting qualified people who can do LSA, and (3) getting the funds to pay for LSA. To have available the type of information and data needed on existing systems, equipment, and parts, the current defense data reporting procedures will have to be modified or new ones developed. (See pp. 17 and 18.) Until such changes are made, special data gathering efforts will have to be initiated on each new development program.

The shortage of qualified people to do LSA is also widely recognized within DOD and by contractors. DOD training programs have been expanded recently to try to cope with the problem, but it appears that the shortage will exist for many more years. Also, as noted earlier, the services have established offices to assist project offices and contractors with their LSA programs. These offices, however, said that they are in need of more trained staff members especially with the added emphasis now being placed on LSAs.

Because of the difficulty of getting data, the need for qualified people, and the complexity of an LSA program which can require elaborate computer software, LSA programs can be very expensive. Unless DOD is willing to invest more funds in the early research and development efforts of programs to pay for indepth LSAs, the comprehensive LSA efforts needed to effect design changes will not materialize. The amount of additional funds needed can be partially offset through tailoring LSA to the specific program needs and then purging separate analyses which provide only duplicative information to that obtained through LSA. We found this to be a very common problem. Also, LSAs can often be made simpler and less expensive by using relatively simple models complemented with a good knowledge of design alternatives.

Difficulties in projecting readiness rates

The quantitative analyses called for in Directive 5000.39 to assess the adequacy of logistic plans, resources, and support-related parameters to meet system goals will also be very difficult to perform. The major problems will be obtaining the necessary data inputs and developing valid models to use in projecting the probable system readiness rates. There are many models available, but their usefulness in making accurate readiness predictions is questionable.

Inadequate guidance

There has been and continues to be a shortage of guidance to ensure that critical initiating program documents--particularly MENS, requests for proposals, and contracts--contain the language needed to get logistic support designed into systems. The MENS statements are to contain logistics considerations, but only the Air Force has issued detailed guidance to assist those who prepare MENS to ensure that logistic considerations are effectively addressed. Guidance is also needed on how to incorporate qualitative and quantitative requirements in contracts which force designers to give attention to supportability.

Also, there is very little guidance provided by the services to project offices on how to implement LSA in contracts. Guidance is needed on how to prepare requests for proposals and contracts so that the contractor's LSA program will be tailored to the needs of the system to be acquired. Criteria is also needed for evaluating contractor's LSA program proposals for source selection purposes. A standard format is needed for contractors to use in preparing their LSA proposal to ensure that competing contractor's proposals can be compared and that each addresses all aspects of the proposed LSA effort. This guidance is important because, if a program is to have a comprehensive LSA, it must be written into the contract as it is the contractor who will do most of the LSA. While Directive 5000.39 contains implementing guidance, we believe that this needs to be supplemented with detailed guidance (possibly even model statements) to ensure that specific matters, such as those cited above, are adequately addressed.

Insufficient evaluation and testing

Adequate independent evaluation of a program's ILS planning, testing, and evaluation of a system's logistic supportability before a production decision are critical parts of the acquisition process. Currently, these tasks are not being adequately accomplished and improvements are needed.

We found that the logistic review groups in the Army, Navy, and Air Force (see p. 21) review primarily major programs and thus many less than major programs are not subjected to the type of independent review needed to ensure that logistic support is adequately planned. The Naval Material Command has instructed its three system commands (Air, Sea, and Electronics) to set up such reviews, but unless additional staff members are added, we believe it will be very difficult to get these reviews done.

The need for improved testing and evaluation of a system during development has been identified by OSD. (See pp. 20 and 21.) This will continue to be a serious problem until DOD takes steps to improve the quality of the testing program.

Complacent attitude of decisionmakers

The attitude toward logistic support which has fostered so many of the problems the Armed Forces have today may plague the implementation of the new policies. Decisionmakers throughout the acquisition process will have to be willing to invest the resources needed to implement the new policies.

Management will still be driven to meet cost, schedule, and technical performance parameters. Increased emphasis on initiating the LSA process at the start of the acquisition process will help, but LSAs do not make decisions. If management must sacrifice acquisition dollars or technical performance to improve supportability, there could be little impetus for them to do so, especially considering the extreme difficulties in quantifying the benefits of improved supportability. As a consequence, most design trade-offs may continue to favor cost, schedule, and technical performance.

CONCLUSIONS

In the past there has been insufficient attention given to logistic support planning during the acquisition cycle. We believe this has contributed to the poor operational availability/supportability of many deployed systems. These problems along with upward spiraling operational and support costs have led DOD to make long needed revisions to major acquisition policy, including making supportability as important an acquisition consideration as cost, schedule, and performance. Increased attention is now being directed to logistic factors at key acquisition decision points.

Although these initiatives represent a major step in the right direction, successful implementation will be difficult because of (1) the difficulties in doing LSAs, (2) the difficulties in doing quantitative analyses for projecting readiness rates of various system designs and for justifying system design investments and trade-offs to improve logistic supportability, (3) the lack of guidance on addressing logistic support requirements in critical program documents,

(4) insufficient evaluation and testing of the ILS planning and logistic supportability of systems, and (5) a potentially complacent attitude by decisionmakers.

Unless these needs and problems are addressed by DOD, the positive impact of the new policy initiatives will never fully materialize. The actions needed will require people and money, both scarce resources. However, we see this as a necessary step if DOD really intends to minimize the problems of high support costs and low readiness rates so common in today's complex/sophisticated weapon systems.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

We recommend that the Secretary of Defense

--develop new or modify current data reporting procedures to provide the information needed for performing LSAs,

--establish logistic support research and study programs to develop improved quantitative methods for assessing (1) the adequacy of logistic support plans, resources, and support-related parameters and (2) the benefits of design changes in the acquisition process to improve the supportability of a system,

--provide detailed guidance to ensure that critical program documents (for example, MENS, request for proposals, and contracts) contain the language needed to obtain systems which are designed to be supportable, and

--provide for improved testing and evaluation of the supportability of systems before they are deployed.

AGENCY COMMENTS

DOD agreed with our findings, conclusions, and recommendations. (See app. III.) In commenting on the need for logistic support research and study programs, OSD stated that direction was sent in September 1980 to the military departments to initiate a research and development program for improvement of weapon system support. Regarding the need for guidance, DOD pointed out that some implementing guidance has been included in DOD Directives 5000.39 and 5000.40. This guidance, however, is not in the detail needed, as discussed on page 24.

CHAPTER 4

HUMAN RELIABILITY--A MAJOR FACTOR WHICH HAS NOT BEEN ADEQUATELY CONSIDERED IN SYSTEM DESIGN

Failures of deployed systems are often caused by human-induced errors. There are indications that the percentage of failures due to human ineptitude or poor human reliability [1] may be quite high. The increasingly complicated nature of modern military systems together with shortages of qualified military personnel suggests that human-induced errors both in operation and maintenance of systems will increase unless more attention is given to this problem in the design and development phases of the acquisition process.

Military specifications, standards, and handbooks on human factors do not adequately consider human limitations such as skill levels, proficiency, availability, environmental stress, and fatigue. Also, there are no common methodologies or data sources for forecasting skill levels of future military personnel, and there does not appear to be sufficient emphasis on testing systems from a human reliability standpoint.

HUMAN-INDUCED MALFUNCTIONS MAY BE A VERY SERIOUS PROBLEM

The human limitations of the operator and maintainer can cause system failures. The extent of this problem, however, cannot be accurately estimated from data in current failure reporting systems. Based on interviews we conducted and studies we reviewed, we are convinced that a large number of system failures are the result of human error. We found a DOD and contractor study which share this position. Both estimate that human errors account for at least 50 percent of the failures of major systems.

The problem of human-induced failures may very well become worse. Attendant to the increasingly complicated nature of systems are the lower education and aptitude levels of personnel now entering the services, the shortages and high turnover rate of experienced personnel which leads to very

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[1] Human reliability as used here is defined as the probability that human error (by either the operator or the maintainer) will not cause a system failure or malfunction.

A LARGE NUMBER OF WEAPON SYSTEM FAILURES MAY BE THE RESULT OF HUMAN ERROR.

SOURCE: DEPARTMENT OF THE NAVY

low overall experience levels, and the effect of greater use of complex/sophisticated automatic checkout and built-in test equipment. For a system to operate successfully, the designer must fully consider the following types of characteristics of the personnel who will operate and maintain the system when it is eventually deployed:

--Muscular strength and coordination.

--Body dimensions.

--Perceptions and judgment.

--Sensory capacities.

--Native skills and capacity to learn new skills.

--Optimum workload.

--Basic requirements for comfort, safety, and freedom from environmental stress.

THE IMPACT OF PEOPLE ON SYSTEMS

The following quote, taken from an Army technical memorandum, indicates the importance of the operator's and maintainer's relationship to an item of hardware.

> "People are the only responsible agents in the system. No matter how small the roles assigned to people, they are responsible roles. People determine whether the system is ready to operate, what it is to do, how and when it is to do it, when and what variations in performance are to occur, and what constitutes adequate or complete performance. People decide, control, guide, change, and evaluate. They are expected to anticipate, detect, compensate for, and explain any undesirable variations in performance. And their errors assume a significance commensurate with their responsibilities."

Although human-induced failures adversely affect operational availability, the failures are usually charged to system unreliability. A failure or an unscheduled delay is considered to be human initiated only if the human can be clearly identified as the "causative agent" leading to the failure or system inoperativeness. Many human-initiated malfunctions, however, are not clearly identifiable. This lack of recognition is not an easily cured malady. The hardware failure usually occurs before the human-induced action is detected and it (the failure) is a quantifiable entity making it easy to report. In general, the five types of human errors which cause most failures can be identified as follows:

--Failure to follow procedures. 1/

--Incorrect diagnosis of particular situations.

--Misinterpretation of communications (written or verbal).

--Inadequate support, tools, equipment, and environment.

--Insufficient attention or caution.

HUMAN RELIABILITY CAN BE IMPROVED OR DEGRADED BY DESIGN OF EQUIPMENT

Poor design, particularly of support, maintenance, and checkout equipment, can significantly increase the probability of system failures once the system is deployed.

The following very brief itemization is representative of the types of problems that can be directly related to the design of the system or its support equipment compared to the capabilities or aptitudes of operators/maintenance personnel:

--Indicator meters and readouts not readily visible.

--Parts not accessible or special tools required.

--Multiple-interactive adjustments required.

--Visual aids and wiring diagrams which are overly complex.

--Labeling and coding instructions unclear.

--Faulty equipment setup awkward for operator use or maintenance action.

1/It should be noted that human nonadherence to procedures may be detrimental to system performance and produce mission failures, but these procedural errors do not necessarily induce equipment failures.

We found several specific examples of system designs significantly increasing the probability of human-induced errors. On the P-3 and S-3 aircraft programs, a large number of deficiencies identified when these systems were first deployed were identified as operator errors induced by poor design of the aircraft's display and control components. An antitank weapon system is another example. In firing the weapon, the normal operator is unable to keep still long enough to accurately direct the missile to the target.

We believe there has been considerable effort to adapt man to the constraints built into the hardware instead of using manpower factors as design criteria. Until OSD published the memorandum, "Manpower Analysis Requirements for System Acquisition," August 17, 1978, there was no specific DOD-wide guidance on manpower planning for new systems.

A review of past and existing military specifications, standards, and handbooks on human factors and human engineering reveals that most of them deal exclusively with the human physical characteristics and design interface. Although they furnish a basis for design of the immediate interface between man and machine, they do not provide the broader manpower factors data (for example, skill levels, proficiency, availability, rotation rates, cost, and so forth) necessary to evaluate alternative designs to determine the optimum design for minimum cost of ownership and maximum effectiveness. The recently revised DOD Instruction 5000.2, March 19, 1980, does address skill requirement as a "consideration and constraint" in system design.

INSUFFICIENT EARLY PLANNING FOR HUMAN RELIABILITY

In pursuing the question of why deployed systems seem to be afflicted by so many human-related problems, we found that there are no commonly accepted methodologies or sources of data which the services can use to forecast skill levels of potential military personnel in the upcoming 5- to 10-year period. Without such basic data, it is difficult for hardware developers to properly estimate human reliability and consider it in the design of a system.

The need for improved personnel planning data has been recognized within DOD. In 1977 the Navy initiated the Hardman Program to develop methodologies for determining manpower requirements associated with systems being developed and procured. In February 1978 the Army's Operational Test and Evaluation Agency informed the Army Vice-Chief of Staff that the neglect of human characteristics in planning and testing has caused serious and costly problems. In August 1978 the Assistant Secretary of Defense (Manpower, Reserve Affairs, and Logistics) informed the secretaries of the military departments that they "should place greater emphasis on controlling and forecasting the effects of our weapon systems on manpower and personnel needs."

In November 1978, the Army Materiel and Readiness Command instructed its program managers and development commands to prepare a human factors engineering analysis for presentation at the preliminary review of each Army Selected Acquisition Review Council milestone. Army's Human Engineering Laboratory was tasked to provide assistance. To our knowledge, that is the only human factors-dedicated organization which now has a more or less direct access (through the Office of the Army's Deputy Chief of Staff for Personnel) to the acquisition management process.

TESTING PROCEDURES HAVE NOT GIVEN HUMAN RELIABILITY ADEQUATE EMPHASIS

In our review of how much human reliability emphasis is applied during testing, we received the following from the military services test organizations.

--In many cases, dedicated human reliability testing is permitted only on a "not-to-interfere" basis.

--In the early stages of system testing, participants are usually drawn from contractor technicians, engineers, and other contractor personnel. This practice could easily result in biased outcomes as contractor personnel are often more skilled and experienced than the military personnel who will ultimately use the system.

--When human reliability has been acknowledged during testing, the attention was normally dedicated to the performance of equipment operators versus maintenance personnel. Maintenance considerations have generally been minimal, if considered at all. In the area of maintenance the concern seems to be in structuring training courses, not examining designs for things like accessibility, degree of difficulty, and so forth.

--Even when a system reaches the testing stage, program managers do not get easily motivated by nonhardware limitations presented by human engineering.

> Anthropometric (man's physical size) measurements are always considered during testing, but intangibles such as perception limitations, man's performance under stress or fatigue, and workload limitations are not commonly appreciated.

CONCLUSIONS

There are indications that human ineptitude or poor human reliability may cause over 50 percent of all weapon system failures. The increasingly complicated nature of modern military systems together with internal military personnel problems suggests that human-induced errors both in operations and maintenance could also increase unless more attention is paid to this problem during design and development. Weapon system designs have been dictating manpower requirements. What is needed is a continuing interface between the system designers and the manpower planners with manpower requirements influencing system design and vice versa.

If the design of systems is to adequately consider all the human limitations (including skill levels, proficiency, availability, environmental stress, and fatigue), military specifications, standards, and handbooks must address these factors. Existing documents do not. Also, common methodologies and sources of data are needed to forecast skill levels of potential military personnel 5 to 10 years in the future. This information, which would be extremely valuable to system designers and testers, is currently not available.

Finally, there does not appear to be sufficient emphasis on testing systems from a human reliability standpoint particularly in the developmental stages of the acquisition process. This could result in design errors requiring expensive modifications after the system is deployed.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

We recommend that the Secretary of Defense

--modify human factor specifications, standards, and handbooks used in system design so that they adequately address human limitations, such as skill levels, proficiency, availability, environmental stress, and fatigue, which can result in human-induced system failures,

- --develop common methodologies and data sources for use by system designers in forecasting skill levels of military personnel 5 to 10 years in the future, and

- --ensure that all major systems are subjected to adequate testing and examination from a human factors standpoint, throughout the acquisition process, particularly in the developmental stages.

AGENCY COMMENTS

DOD agrees with our findings, conclusions, and recommendations. (See app. III.) In commenting, DOD emphasized the need for continuing interaction between system designers and manpower planners with this circular process providing a better framework for the system designers.

CHAPTER 5

QUALITY ASSURANCE--MINIMIZING THE GAP BETWEEN DESIGN RELIABILITY AND FIELD RELIABILITY

The reliability intended to be designed into a system is often not being achieved in the field. It is the task of quality assurance to help minimize this gap. We found that there is a lack of adequate guidance for program managers on how to influence design from a quality assurance standpoint. Also, files on contractors' quality histories have not been fully established and the cross-service product quality deficiency reporting requirement has not been fully implemented. Also, there is a shortage of engineers in the Government who are qualified to address quality assurance.

THERE IS A GAP BETWEEN DESIGN RELIABILITY AND FIELD RELIABILITY

DOD has been placing greater emphasis on reliability in recent years, particularly in the late 1970s. This emphasis is reflected first in policy revisions including the new DOD Acquisition Directive 5000.40, "Reliability and Maintainability," issued July 8, 1980. Not only has there been greater policy emphasis, but implementation of these policy changes can be seen in the strengthening of contract requirements, testing procedures, and program reviews.

Some of the hard earned reliability improvements in the design are, however, being lost in the manufacturing process or in the operating environment resulting in a gap between the design reliability and the field reliability. An example of this is 150,000 projectile fuses purchased by the Navy. These fuses were developed to obtain commonality with fuses used by North Atlantic Treaty Organization nations. The fleet was unable to use these fuses because the tolerance levels were such that the fuse would not fire from a gun that was not perfectly maintained, a near impossible task in a shipboard environment.

While DOD recognizes that this gap exists, the extent of the problem is very difficult to quantify, particularly in the complex/sophisticated weaponry of today. Correction of the problem, however, must start at the very beginning of the acquisition process with the design of the system. Because of the importance of quality in system designs, we looked at DOD's efforts in the area of quality assurance.

CRITICALITY OF QUALITY ASSURANCE

It is the task of quality assurance to help minimize the gap between the reliability designed into a system (inherent reliability) and the reliability experienced when the system is deployed (achieved reliability). DOD defines quality assurance as:

> "A planned and systematic pattern of all actions necessary to provide adequate confidence that adequate technical requirements are established; products and services conform to established technical requirements; and satisfactory performance is achieved."

With the technological advances of recent years, the criticality of quality assurance has increased significantly. Sophisticated techniques are being used to test the quality and reliability of components early in the system's development. With DOD's increasing emphasis on problem prevention instead of detection, quality now must become involved in the early phases of the acquisition cycle.

Quality assurance provides confidence that, for example:

--The tolerances called for in machining are cost effective.

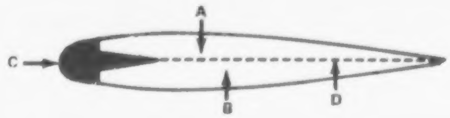
--The material to be used is compatible with the manufacturing process.

--The parts to be manufactured from the drawings can be tested to confirm compliance with the design.

Recent designs of helicopter main rotor blades further illustrate the criticality of quality assurance. The designs for these blades have used composite material bonded to a metal spar under heat and pressure.

FIGURE 4

COMPOSITE HELICOPTER ROTOR BLADE CONSTRUCTION



In this particular illustration two separate pieces of composite material, (A) and (B), are to be bonded to metal spar (C) and to each other. The critical test is examination of the bond seam (D) to ensure there are no voids where the blade might begin to come apart under the high stresses imposed on helicopter blades.

When the X-ray examination was attempted, it was discovered that the bonding material specified in the design was of such a composition that X-ray photography would not work. Since no alternative type of testing was available, the design had to be changed to specify a different bonding material that could be X-rayed.

In this illustration, the importance of adequate quality assurance testing, and therefore of testability, is clearly demonstrated. The significance (or criticality) of the required design change is a matter of timing. The more complete a system assembly becomes before a subsystem or component is found to be defective or untestable, the more expensive the corrective action or replacement will be.

DIFFICULTIES IN ADDRESSING QUALITY ASSURANCE

When a manager does wish to address quality assurance, he faces several problems. First, efforts on the front end of a design process to address quality assurance cost money. Also, although failure to expend the effort may result in lower reliability and increased support costs, the benefits are difficult to quantify. The savings do not manifest themselves in acquisition dollars but in support dollars. Second, there is a lack of role and responsibility definition for design evaluation from the quality assurance viewpoint. Third, the program manager may lack confidence in the quality assurance staff due to a scarcity of sufficiently qualified personnel, especially engineers.

Lack of design evaluation guidance and incomplete policy implementation

While the DOD Directive 4155.1 (Quality Program), revised in 1978, recognizes the importance of quality assurance, OSD has not yet taken certain steps which are critical to successful implementation of the policy. Part of the problem may be a serious staffing shortfall in the quality assurance function at OSD where only one person is devoted to the policy aspects of quality assurance. This individual is understandably limited in how much he can accomplish. Quality assurance concerns arising during his absence go unaddressed. Efforts to unify regulations and to provide detailed guidance to the services are hampered. For example, regarding implementation of the revised directive:

--Directive 4155.1 recognizes the need to influence system designs by requiring specifications in contracts of the required quality characteristics. OSD has given the program manager the responsibility for reviewing contractors' designs for quality assurance but has not provided guidance on how this is to be done.

--The quality history files on contractors, required in Directive 4155.1, have not been fully established. Files on some contractors still have not been set up. This system is intended to prevent the awarding of contracts to contractors with poor quality performance records.

--The cross-service product quality deficiency reporting, required in Directive 4155.1, has not been fully automated. The Army and the Air Force are the only two DOD components to have accomplished this. Also, a central data bank for consolidating the DOD component reports into one report has not been set up. This would greatly facilitate the transfer of information on quality problems among all DOD components.

Regarding implementation of the new policy emphasis on quality assurance in the design process, we examined the standard quality specification which is mandatory for use by DOD agencies in all major acquisition contracts--MIL-Q-9858A, "Quality Program Requirements." We found it to be old and in need of revision. Originally promulgated in 1959, it was revised and reissued in 1963. It has not been significantly changed since. The primary concern of the document is quality control: the in-process inspection of work and correction of problems discovered during production. Design is addressed as an area of consideration in the summary of the specification but is not referred to again, except as a matter for corrective (rather than preventive) action. This clearly does not recognize changes toward designed-in quality which have occurred in the acquisition process and the quality discipline since 1963.

In recognition of deficiencies in the specification, OSD has proposed adoption of a draft revision to a North Atlantic Treaty Organization quality publication. The Organization's quality assurance procedure repeatedly emphasizes the need to aggressively control design and development.

On the positive side, we found that OSD has established a standardization project run by the Army. The objectives of the project are to minimize the differences among service-level implementation policies and regulations and to unify DOD's basic approach to quality assurance.

Need for additional and better qualified staffing

Dealing with today's advanced weapon systems is difficult in all aspects, including the attainment of adequate quality assurance during the acquisition cycle. In the second DOD Conference on Quality Assurance Management in March 1980, the introductory remarks include this comment:

> "The increasing complexity of our weapon systems and equipment has caused a corresponding complexity in the tasks facing quality assurance personnel."

The majority of the DOD quality assurance work force has had little training in quantitative analysis or design disciplines and often lacks the technical expertise to deal with complex systems. Also, this work force has decreased 45 percent over the last 10 years while increased complexity and number of contracts has driven the workload requirements up. Pay comparability has been cited as a cause for much of the turnover problem in both recruiting and retention.

RECENT EMPHASIS ON QUALITY ASSURANCE

There is an increasing awareness at the higher levels of DOD and the services that quality is a problem and that many changes must take place if better quality systems are to be produced. We noted earlier that some actions are being taken such as the Army's quality assurance standardization project. (See p. 39.) Following are examples of others.

Actions have been initiated to help alleviate quality assurance staffing problems. These actions include the following.

--The DOD Quality and Reliability Assurance Career Board published a handbook in March 1980 with information on careers in the field to attract more people.

--DOD is also working with the Office of Personnel Management to review the current job classification standards in the quality assurance field. For example, the Navy is promoting the establishment of a new engineering classification, the quality assurance engineer.

The move to upgrade job descriptions and corresponding pay levels, however, is recent and is expected to take 2 years to complete. In the meantime, internal training programs at the service levels are being relied on to improve the quality assurance staff.

--The Army has three intern programs for the quality assurance work force and has recently expanded the engineer program from 18 weeks to 1 year of classroom training.

--The Navy has a 3-year old quality engineer intern program with most of the training accomplished by contractors in accordance with Navy requirements and specifications.

--The Air Force is developing an intern program for acquisition quality assurance personnel which should be underway shortly.

Regarding the need to justify the expenditures necessary for adequate "front-end" quality assurance, one service plans to develop an itemized checklist to allow a program manager to identify the cost of successively more intensive levels of attention to quality assurance during the acquisition cycle.

NEED FOR NEW TERMINOLOGY

There is general confusion as to the meaning of quality, quality control, and quality assurance. We suggest a phrase of increasing popularity, "product assurance," as the beginning of the solution. Product assurance has been defined as follows:

> "PRODUCT ASSURANCE is the application of interdisciplinary skills to accomplish the preventive and conformance activities necessary to assure: that requirements are properly specified, that the design will achieve these requirements and that the ultimate product and/or services will perform their intended functions in the operational environment for the period specified."

This quote, taken from the Air Force Systems Command's 1979 "Quality Horizons Final Report," sums up the concept of an interdisciplinary approach to quality which now is in use, in part, by most of the services. Product assurance goes beyond quality control and beyond quality assurance to incorporate reliability, maintainability, and other related disciplines.

CONCLUSIONS

Increasing complexity/sophistication of weapon systems has already led to quality considerations going beyond traditional concerns with quality control into participation in the transition from concept to design. While the importance of quality assurance in the design process is becoming well recognized, the influence quality assurance will have on design is being diluted by a number of factors which need to be addressed by OSD.

First, the focal point of all program efforts--the program manager--has been given much direction about quality, but little help or incentive in pursuing it. He has been directed to evaluate designs for quality and is now in need of comprehensive guidance on how this is to be done. The principal quality assurance specification does not meet this need.

Second, the quality history files on contractors have not been fully established and the cross-service product quality deficiency reporting requirement has not been fully implemented. Until these actions take place, selection of contractor(s) to develop a new weapon system cannot adequately consider contractors' quality histories.

Finally, there is a shortage in DOD of engineers adequately trained in quality assurance. Actions are needed to address this situation and strengthen the quality assurance work force. Some changes are being made, but they do not appear to be sufficient considering the needs.

RECOMMENDATIONS TO THE SECRETARY OF DEFENSE

We recommend that the Secretary of Defense

- --produce comprehensive guidance as to how designs should be evaluated for quality assurance,
- --ensure that the quality history files on contractor are fully established and that the cross-service product quality deficiency reporting requirement is fully implemented, and
- --strengthen the quality assurance work force so as to permit their active involvement in the design phase of the acquisition process.

AGENCY COMMENTS

DOD agrees with our findings, conclusions, and recommendations. (See app. III.)

LOCATIONS VISITED DURING REVIEW

UNITED STATES

OSD

--Assistant Secretary of Defense (Manpower, Reserve Affairs, & Logistics), Washington, D.C.

--Under Secretary of Defense for Research & Engineering, Washington, D.C.

--Office of the Joint Chiefs of Staff, Washington, D.C.

Army

--Headquarters, Army Forces Command, Fort McPherson, Georgia.

--Headquarters, United States Army Materiel Development and Readiness Command, Alexandria, Virginia.

--Headquarters, United States Army, Washington, D.C.

--Headquarters, United States Army Training and Doctrine Command, Fort Monroe, Virginia.

--United States Army Materiel Readiness Support Activity, Lexington, Kentucky.

--United States Army Human Engineering Laboratory, Aberdeen Proving Grounds, Maryland.

--United States Army Materiel Systems Analysis Agency, Aberdeen Proving Grounds, Maryland.

--Headquarters, 4th Infantry Division, Fort Carson, Colorado.

--United States Army Tank Automotive Materiel Readiness Command, Warren, Missouri.

--United States Army Missile Command, Huntsville, Alabama.

--United States Army Infantry Center, Fort Benning, Georgia.

--Headquarters, United States Army Electronics Research and Development Command, Adelphi, Maryland.

--United States Army Troop Support and Aviation Materiel Readiness Command, St. Louis, Missouri.

Navy

--Office of the Chief of Naval Operations, Washington, D.C.

--Headquarters, Naval Material Command, Washington, D.C.

--Naval Air Systems Command, Washington, D.C.

--Naval Electronics Systems Command, Washington, D.C.

--Naval Sea Systems Command, Washington, D.C.

--Naval Supply Systems Command, Washington, D.C.

--Headquarters, Commander-in-Chief, U.S. Atlantic Fleet, Norfolk, Virginia.

--U.S. Naval Surface Forces, Atlantic Fleet, Norfolk, Virginia.

--U.S. Naval Air Forces, Atlantic Fleet, Norfolk, Virginia.

--U.S. Naval Submarine Forces, Atlantic Fleet, Norfolk, Virginia.

--Commander Operational Test and Evaluation Forces, Norfolk, Virginia.

--U.S. Naval Ship Engineering Center, Norfolk Division, Norfolk, Virginia.

--U.S. Navy Fleet Analysis Center, Corona, California.

--U.S. Marine Corps Headquarters, Deputy Chief of Staff for Installations and Logistics, Arlington, Virginia.

Air Force

--Headquarters, United States Air Force, Washington, D.C.

--Air Force Logistics Command, Wright-Patterson Air Force Base, Ohio.

--Air Force Systems Command, Andrews Air Force Base, Maryland.

--Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

--Headquarters, Air Force Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio.

--Headquarters, Air Force Tactical Air Command, Langley Air Force Base, Virginia.

--Air Force Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio.

--Air Force Flight Test Center, Edwards Air Force Base, California.

Contractors

--McDonnell Aircraft Company, St. Louis, Missouri.

--General Dynamics, Fort Worth, Texas; Pomona, California.

--Bendix Corporation, Teterboro, New Jersey.

--Bell Helicopter Textron, Fort Worth, Texas.

--IBM, Federal Systems Division, Manassas, Virginia.

--Hughes Aircraft Company, Culver City, California.

--Chrysler Corporation, Warren, Michigan.

Other U.S. locations

--CACI, Inc., Arlington, Virginia.

--Defense Audit Service, Washington, D.C.

--Defense Logistics Agency, Washington, D.C.

--Defense Systems Management College, Fort Belvoir, Virginia.

--Society of Logistics Engineers, Washington, D.C.

EUROPE

--Headquarters, U.S. European Command, Stuttgart, Germany.

Army

--Headquarters, U.S. Army Europe, Heidelberg, Germany.

--Headquarters, U.S. Army VIII Corps, Stuttgart, Germany.

--Headquarters, 3rd Infantry Division, Wurzburg, Germany.

1. Headquarters, 3rd Infantry Division Artillery, Wurzburg, Germany.

2. 2nd Infantry Brigade, Hohenfelds, Germany.
   1st Battalion, 10th Artillery, Scheinfurt, Germany.
   3rd Squadron, 7th Cavalry Regiment, Scheinfurt, Germany.

3. 3rd Brigade A Schaffenburg, Germany.
   703rd Direct Support Maintenance Battalion, Kitzingen, Germany.
   3rd Aviation Battalion, Kitzingen, Germany

--Headquarters, 17th Field Artillery Brigade, VII Corps Artillery, Augsburg, Germany.

1. 1st Battalion, 18th Artillery, Augsburg, Germany.

2. 1st Battalion, 36th Artillery, Augsburg, Germany.

3. 1st Battalion, 30th Artillery, Augsburg, Germany.

--Headquarters, 1st Armored Division, Ansbach, Germany.

1. 3rd Brigade, Bamberg, Germany.

2. 501st Aviation Battalion, Ansbach, Germany.

3. Division Support Command, Ansbach, Germany.

4. 1st Battalion, 94th Artillery, Grafenwohr, Germany.

5. 1st Battalion, 37th Armor, Ansbach, Germany.

6. Headquarters, Division Artillery, Ansbach, Germany.

Navy

--Headquarters, U.S. Naval Forces Europe, London, England.

--Headquarters, U.S. Sixth Fleet, Gaeta, Italy.
--Commander, U.S. Sixth Fleet Battle Forces, aboard U.S.S. Independence (CVA-62), Naples, Italy.

--Headquarters, U.S. Sixth Fleet Maritime Surveillance and Reconnaissance Force, Naples, Italy.

--Headquarters, U.S. Sixth Fleet Attack Submarine Force, Naples, Italy.

--Officers and crew members of U.S.S. Independence (CVA-62), U.S.S. Mahan (DDG-42), and U.S.S. Memphis (SSN-691), Naples, Italy.

Air Force

--Headquarters, U.S. Air Force Europe, Ramstein, Germany.

--Headquarters, 17th Air Force, Sembach, Germany.

1. The 86th Tactical Fighter Wing, Ramstein, Germany.
2. The 36th Tactical Fighter Wing, Bitburg, Germany.
3. A-10 Unit, Sembach, Germany.

OTHER RELEVANT GAO REPORTS

ISSUED BETWEEN JANUARY 1979 AND NOVEMBER 1980 1/

Date	Number	Title
11/13/80	C-PSAD-81-4	Improvements in Performance and Reliability Should Govern Future Procurement of Army's Copperhead Projectile (Classified)
10/24/80	C-LCD-81-1	Navy's Antisubmarine Warfare Capability--Is It Sufficient? (Classified)
9/30/80	PSAD-80-72	Are Management Problems in the Acquisition of Aircraft Gas Turbine Engines Being Corrected?
9/16/80	LCD-80-102	Survey of the Readiness of Minutemen Missiles
9/4/80	LCD-80-106	Survey of DOD's Management of Automatic and General Purpose Electronic Test Equipment
8/21/80	LCD-80-78	Opportunities for Future Improvement of Government Logistics Management
8/20/80	LCD-80-89	F-16 Integrated Logistic Support: Still Time to Consider Alternatives
7/22/80	FPCD-80-58	Actions to Improve Parts of the Military Manpower Mobilization System Are Underway
6/30/80	PSAD-80-61	Implications of Highly Sophisticated Weapon Systems on Military Capabilities

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1/Instructions for obtaining copies of our reports are on the inside front cover of this report. To obtain copies of classified reports, security clearance information must be provided along with a demonstrated need-to-know.

Date	Number	Title
6/12/80	PSAD-80-43	Issues Identified in 21 Recently Published Major Weapon System Reports
6/6/80	LCD-80-65	Operational and Support Costs of the Navy's F/A-18 Can Be Substantially Reduced
5/9/80	PSAD-80-40	Is the Joint Air Force/Navy Alternate Engine Program Workable? GAO Thinks Not as Presently Structured
4/14/80	C-FPCD-80-3	Overview of the Manpower Effectiveness of the All-Volunteer Force (Classified)
4/1/80	LCD-80-48	Logistics Management Issues Staff Study
2/20/80	FPCD-80-10	Attrition in the Military--An Issue Needing Management Attention
2/15/80	FPCD-80-31	The Navy's Pilot Shortage: A Selective Bonus and Other Actions Could Improve Retention
2/7/80	LCD-80-30	Increased Standardization Would Reduce Costs of Ground Support Equipment for Military Aircraft
1/29/80	PSAD-80-20	XM-1 Tank's Reliability is Still Uncertain
12/11/79	LCD-80-2	Improving the Effectiveness of Joint Military Exercises--An Important Tool for Military Readiness
12/11/79	FPCD-80-6	Estimates of Available Hours for Military Personnel in Wartime Distort Force Requirements and Planning
11/26/79	C-FPCD-80-1	Active Duty Manpower Problems--Barrier to Mission Accomplishment (Classified)

Date	Number	Title
11/13/79	C-PSAD-80-2	Army Operational Test and Evaluation Needs Improvement (Classified)
11/8/79	PSAD-80-6	Impediments to Reducing the Costs of Weapon Systems
11/6/79	LCD-80-11	Modernizing the Air Reserve Force--More Emphasis on Logistics Support Needed
10/30/79	C-LCD-80-2	A-10 Aircraft Logistics Support Can Be Better Matched with Operational Requirements (Classified)
10/12/79	LCD-80-5	DOD's Material Readiness Report to the Congress--Improvements Needed to Better Show the Link Between Funding and Readiness
9/28/79	LCD-79-414	Alternatives to Consider in Planning Integrated Logistics Support for the Trident Submarine
9/11/79	PSAD-79-99	Manufacturing Technology--A Cost Reduction Tool at the Department of Defense that Needs Sharpening
8/20/79	LCD-79-423	Letter Report on GAO's Concerns with the Readiness of U.S. Forces (Classified)
8/9/79	PSAD-79-95	Army Procurement of 10kW, 60Hz Gas Turbine Generators is Highly Questionable
7/31/79	FPCD-79-13	DOD Oversight of Individual Skill Training in the Military Services Should be More Comprehensive
7/11/79	FPCD-79-58	Critical Manpower Problems Restrict the Use of National Guard and Reserve Forces
6/28/79	FPCD-79-3	Can the Individual Reserves Fill Mobilization Needs?

Date	Number	Title
6/25/79	PSAD-79-86	Effectiveness of DOD's Development Test and Evaluation
5/17/79	FPCD-79-40	Problems in Getting People Into the Active Forces After Mobilization
5/10/79	LCD-79-407	If Army Helicopter Maintenance Is to Be Ready for Wartime, It Must Be Made Efficient and Effective in Peacetime
4/25/79	PSAD-79-64	Digests of Major Weapon System Reports Issued January and February 1979
4/25/79	LCD-79-404	Can the Army and Air Force Reserves Support the Active Force Effectively?
4/23/79	LCD-79-406	The United States Air Force Tactical Air Command--Is It Ready? Can It Fulfill U.S. Commitments to Rapidly Increase Its Forces in Europe?
4/28/79	PSAD-79-44	The Effectiveness of the F-14A/ Phoenix Weapon System Is Marginal at Best Against the Current and Postulated Threat (Classified)
2/20/79	PSAD-79-9	Observations on Office of Management and Budget Circular A-109--Major System Acquisitions by the Department of Defense
2/12/79	LCD-78-430	Readiness of Conventional U.S. Air Forces in Europe--Selected Aspects and Issues
2/6/79	LCD-78-417A	Marine Amphibious Forces: A Look at Their Readiness, Role, and Mission
1/24/79	FPCD-78-82	DOD's "Total Force Management"--Fact or Rhetoric?

THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

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01 DEC 1980

Mr. W.H. Sheley, Jr.
Acting Director, Procurement and Systems
Acquisition Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Sheley:

This is in reply to your letter to the Secretary of Defense regarding your draft report on "Ownership Considerations Need More Emphasis in Weapon Systems Design", OSD Case #5538, GAO Code 951516.

We have reviewed the draft report and believe it is excellent and well-balanced. DoD agrees with GAO in the need to strengthen these activities. The report accurately represents our recent efforts to increase the emphasis on ownership and support considerations during the development of DoD systems. The report discusses the degree of difficulty associated with many of the areas of logistics analysis and projection as well as the difficulty in testing a system's logistics supportability. The report also recognizes recent policies issued by DoD to emphasize these very important considerations and the fact that there has not been sufficient time to accrue full benefit from these recent policy changes. The DoD has initiated many activities to follow-up on the new logistic support policies.

The attached comments have been informally discussed with your staff. They serve to clarify some of the significant observations and recommendations in the report. We would appreciate your incorporation of these views in the final report.

We appreciate the opportunity to comment on the draft report and are willing to discuss further with the GAO staff any of the points contained herein.

Sincerely,

Walter LaBerge

Walter B. LaBerge
Principal Deputy

Attachment
a/s

COMMENTS ON OSD #5538

GAO Draft Report "Ownership Considerations Need More Emphasis in Weapon System Design"

GAO Recommendation: "Develop new or modify current maintenance data reporting procedures to provide the information needed for performing logistic support analysis."

OSD Responses: Concur in principle.

There is a need for additional and better historical data to support the performance of logistic support analysis. It is not clear that in all cases this data should be drawn from a maintenance data system. For example, the Air Force is addressing this specific problem with a project entitled "Product Performance Feedback System." This project deals with analysis results rather than data products. Across the wide scope of DoD missions and systems there are a number of different solutions which will address this specific problem. In some instances a new or improved maintenance data system may be the answer, in other situations other alternatives may be preferable. The new Department of Defense Directive on reliability and maintainability (DoDD 5000.40) requires DoD in-service data collection systems to report the measured values of system R&M parameters which relate to readiness, maintenance manpower and logistics support cost. While each Service's implementation may be different, the need for this data has been recognized.

GAO Recommendation: "Establish logistic support research and study programs to develop improved quantitative methods for assessing (1) the adequacy of logistic support plans, resources, and support related parameters, and (2) the benefits of design changes in the acquisition process to improve the future logistic supportability of a system."

OSD Responses: Concur.

On September 3, 1980 direction was sent from OSD to the Secretaries of the Military Departments to initiate a Research and Development program for improvement of weapon support. The scope of this program will include logistic concept development, hardware techniques and design tradeoffs, and weapons system demonstration projects.

GAO Recommendation: "Provide guidance to insure that critical program documents (for example, mission element needs statements, request for proposals and contracts) contain the language needed to obtain systems which are logistically supportable."

OSD Responses: Concur.

Both DoD Directive 5000.39 and 5000.40 both provide implementation guidance on considerations that should be included in various program documents related to support. For example, 5000.39 requires that manpower and logistic resource constraints be identified in the MENS; that contract requirements for full-scale development clearly define baseline operational scenerios, a baseline maintenance concept, and readiness and wartime employment objectives; and that a preliminary manning document and supporting analysis be available by the production decision point. DoDD 5000.40 includes the requirement to specify, in the conceptual phase, the system life profiles and tenative goals for the appropriate system R&M, and the requirement to translate R&M threshold objectives into mimimum acceptable values in contracts for both contractor and government furnished equipment during the full-scale development phase. We will, over the next several years, evaluate the application of this guidance to determine its strenths and weaknesses and will issue supplemental guidance as appropriate.

GAO Recommendation: "Provide for improved testing and evaluation of the logistic supportability of systems before they are deployed."

OSD Response: Concur.

As discussed in the draft report, OSD and the Services have had a joint study underway since March 1979 to address the area of operational suitability evaluation. The first phase of this study examined problems involved in test and evaluation of logistic supportability. The phase one study results summarized in the GAO report point out the many constraints and difficulties involved in implementing existing DoD policies requiring operational suitability evalution. Guidelines for improvements in supportability evaluation are being developed in the second phase of the study.

GAO Recommendation: "Revise the Logistic Support Analysis Military Standard to emphasize that logistic supportability is now as important as cost, schedule and performance and must receive appropriate emphasis in system design."

OSD Response: Concur in principle.

The Military Standard is now under revision to bring the standard into agreement with the new logistics policies. However, the Military Standard is not the best document to provide priorities to the program manager. Other policy directives, including DoDD 5000.1 and DoDD 5000.2 as recently revised, now contain such an emphasis statement. Particular emphasis will be given to the development of logistic analysis guidelines during the critical concept and advanced development phases, where system level tradeoffs affecting cost, schedule and performance are made. We believe this will provide the appropriate implementation guidelines.

GAO Recommendation: "Modify human factor specifications, standards and handbooks used in system design so that they adequately address all human limitations including skill levels, proficiency, availability, environmental stress and fatigue which can result in human-induced system failures."

OSD Response: Concur.

GAO Recommendation: "Develop common methodologies and data sources for use by system designers in forecasting skill levels of military personnel 5 to 10 years in the future."

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OSD Response: Concur in principle.

The forecasting of skill levels is necessary as an input to the system definition effort, however, the skill level is the result of many things including the projected training and the training that is required as a result of system definition. We agree that this circular process should be better addressed and provide a better framework for the system designers.

GAO Recommendation: "Ensure that all major systems are subjected to adequate testing and examination from a human factors standpoint."

OSD Responses: Concur.

This recommendation should be clarified. The use of the word testing might infer that more "after-the-fact" emphasis is recommended. A preferred solution is to provide emphasis at all stages of the system's development from initiation to conclusion.

GAO Recommendation: "Produce comprehensive guidance for program managers as to how a design should be evaluated for quality assurance."

OSD Responses: Concur.

The establishment of this guidance is only one part of the solution to the identified problem. In addition to guidance, the proper management emphasis is also required.

GAO Recommendation: "Implement the data feedback system on contractor quality histories, and insure that the cross-service product quality deficiency reporting requirement is carried out."

OSD Response: Concur.

The cross-service reporting system was established in 1979, but all services/agencies have not yet implemented the program. The Army has completely functioning program and the Air Force is close behind.

GAO Recommendation: "Strengthen the quality assurance workforce so as to permit their active involvement in the design process."

OSD Response: Concur.

OSD General Comments:

GAO Observation (pages vi): "Government quality assurance engineers are in short supply and lack adequate training."

OSD Comment: Engineers in general are in short supply and engineers working in quality assurance are no exception. These are qualified engineers who work in the quality assurance area but who may need more training in quality assurance subjects.

GAO Observation (page 32): "The MENS statements are to contain logistics considerations, but only the Air Force has issued guidance..."

OSD Comment: The Army published a letter of instruction for MENS preparation on January 7, 1980. This instruction provides detailed guidance for preparation and submission of MENS.

GAO Observation (page 54): "The DoD acquisition directives (5000 series), however emphasize repeatedly that the concerns of the manager ought to be cost, schedule, performance, and more recently, supportability."

OSD Comment: This observation does not recognize the discussion of quality/reliability and maintainability contained in DoDI 5000.2 Specific discussion is in paragraphs C.8.2 and C.9.

GAO Observation (page 57): ". . . on how to review designs for quality assurance, we examined the standard quality specification which is mandatory for use by DoD agencies -- MIL-Q-9858A. . ."

OSD Comment: Mil-Q-9858A is for contractual application only, it does not apply to "in-house" DoD activities. The document is currently under revision as part of the NATO AQAP-1 activity.

GAO Observation (page 61): "We suggest a phrase of increasing popularity, "product assurance," as a beginning of the solution. Product assurance has been defined as..."

OSD Comment: The definition as presented in the draft GAO report was taken from the Air Force Systems Command 1979 "Quality Horizons Final Report." It is just an opinion of what should be defined as the integrated subject of quality, quality control, quality assurance, reliability, etc.

GAO Observation (page 75): "Examples of military equipment reported by the services to be undependable and difficult to support and operate."

OSD Comment: Details on these problem statements should be changed.

TOW Problem: Problem statement is not correct. The Army is procuring a new type battery and employing TOW vehicle power conditioners, thus the problem has been eliminated duirng the past 18 months.

DRAGON Problem: Although there have been some component malfunctions (defective thrusters) these problems were detected prior to deployment and use, and thus cannot be said to be said to be contributing to misses.

Track Problem: Change to read: The end connectors and track pads for this track must be replaced at 1500-2000 miles and the entire track between 5000 and 6000 miles. The track cost approximately $23,000 per set. The track pads can be replaced without rebuilding the track and allows the extension of track life described above.

SUMMARY OF SPECIFIC COMMENTS

MADE BY

OUR PROCUREMENT ADVISORY PANEL

1. One of the serious problems affecting ownership considerations in the acquisition process is a lack of continuity in program management--there is a new program manager (a military officer) about every 3 to 4 years. The program manager is most concerned about what happens on his "watch" and thus is not inclined to place emphasis on factors such as supportability, human reliability, and quality assurance where the benefits are realized when the system is deployed. Perhaps a civilian should be designated as project manager and kept in that position until the system is deployed.

2. Contractors have the "know-how" to design more supportable systems. If the Government would give the contractor the financial incentive and responsibility, the system designed would be much more supportable and the financial investment will be returned in reduced operating and support costs.

3. Contracts need to contain language which provide the contractor with qualitative and quantitative requirements that force designers not to ignore supportability.

4. The Government must encourage the application of new technology to the design of the weapon system support systems (for example, test and diagnostic equipment) to improve supportability.

5. The logistic support analysis does not necessarily have to be complex and costly. The analysis needs to be tailored to the specific needs of the weapon system development program using simplified models and a good knowledge of design alternatives as a substitute for complex software.

6. There are serious semantic problems in the whole area of support. There is no common or generally agreed upon set of terms and definitions in the area of supportability. DOD should revise its glossary.

7. There are too many directives, specifications, regulations, and so forth. A major effort is needed to reduce the number.

8. Much attention needs to be given to how designers can design for supportability.

9. The Office of Management and Budget's Circular A-109, approved in 1976, should result in the design of more supportable systems as it provides a basis for review and comparison in the source selection process. Ownership considerations cannot be disregarded in such a process.

10. There is a need to establish a uniform methodology for estimating personnel-related cost factors associated with life-cycle cost projections.

11. No one is looking into the fatigue factor that goes along with combat. How much can an operator or maintainer take before giving up? This needs to be considered in system design.

12. Military personnel should be assigned to contractor facilities to help familiarize themselves with weapon systems being procured. This could greatly reduce the number of human-induced failure in systems.

13. The wrong people are designing manuals and training courses. Engineers write the manuals used by high school students.

14. The Government is going to encounter serious difficulties in devising and initiating an objective, meaningful, timely, and equitable basis for reporting contractor quality histories.

15. There is a need for well written and definitive manufacturing instructions which are understandable at the worker level. This is extremely important and is not always the case. The effect of human factors in the day-to-day production cycle in the manufacturing processes is vital. Units that are difficult to assemble, test, rework, reassemble, and retest encounter many problems.

16. Direct design evaluation for quality assurance by program offices in DOD is not cost effective. The program office should be more concerned about evaluating the contractor's quality assurance program rather than the system design.

17. A committee needs to be established to redefine the roles of the various disciplines which make up

systems engineering. This is necessary to accommodate the new emphasis on supportability.

18. Industry must be made more aware of the problems the military is experiencing with fielded systems. The problems must be defined and engineering analysis done to identify the causes. The current military data reporting systems are inadequate for this purpose.

19. Contractors need to better understand the emphasis to be placed on logistic support in new development programs. There is a need to establish a rating system for use in requests for proposals to convey this emphasis to contractors.

EXAMPLES OF MILITARY EQUIPMENT REPORTED BY THE SERVICES TO BE UNDEPENDABLE AND DIFFICULT TO SUPPORT AND OPERATE

System/equipment	Problem
Army	
TOW (Antitank missile system, ground version)	Battery power supplies were unreliable. As a result, missile launches were jeopardized or guidance was lost during flight.
Dragon (antitank missile system)	Component malfunctions plus human factor problems cause many of these missiles to miss the target.
T142 tank track on M60 series tank	This track must be replaced at 1,500 to 2,000 miles. It is less reliable than its predecessor.
AH-1 "Cobra" attack helicopter	The main rotor hub has significant reliability problems due to frequent failure of feathering axis bearings.
GOER (transport/resupply vehicle)	Extreme bounce generated by vehicle produced serious driver fatigue. Numerous components suffer high rates of failure.
M110 self-propeller howitzer (8 inch)	Numerous hydraulic components problems being experienced since recent modifications added a heavier gun tube. Additional problems exist with road wheels, overheating engines, gun sighting equipment, and projectile ramming systems.
Test and diagnostic equipment used for avionics and electrical subsystems	Equipment is unreliable, requires extensive calibration, and is difficult to repair.

System/equipment	Problem
Navy	
MK-86 gun fire control system on many surface warships	A significantly large number of random failures among the 40,000 plus parts and the inability of supply system to meet these replacement component demands have caused low operational availability.
AN/SPG-55B guided missile control radar on many surface warships	Low reliability, replacement part shortages, and inadequate operator and maintenance training are affecting operational availability.
AN/SPS-40 air search radar on many surface ships	High failure rates of some parts, long time to receive replacement parts, and inadequate number of trained technicians lead to operational availability problems.
Wasteheat boilers on DD-963 class destroyers	Extremely difficult, if not impossible to adequately maintain. Equipment failure would result in partial loss of ship's electrical power, potentially affecting ship's weapon systems.
BQQ-5 sonar on SSN-688 class attack submarines	Severe replacement part shortages have caused submarines to experience mission degradation.
MK-18 periscope on SSN-688 class submarines	Fleet has experienced many problems including (1) slip ring failures, (2) poor logistic support, (3) inadequate technical documentation, (4) inadequate maintenance training, and (5) insufficient technical support equipment.
S3A antisubmarine warfare aircraft	Low reliability of many key electronic components have caused low aircraft operational availability rates.

System/equipment	Problem
Air Force	
"Turkey Feathers" on F-15 aircraft	These engine parts are wearing out after about 15 hours of use. They cost $1,000 each, and each aircraft has about 30 of them.
F-100 engine in F-15 aircraft	Problems with reliability and durability, particularly in the "hot section" of the engine, have led to low operational availability rates.
Automatic test equipment for F-15 aircraft	Problems include (1) lack of adequately trained and experienced operators and maintenance personnel, (2) some software incompatability, and (3) low re liability of the built-in test and avionics intermediate shop automatic stations. These problems degrade testing efficiency and ultimately degrade aircraft's operational readiness.
Stability augmentation system in A-10 aircraft	Problems with targeting on the first 201 aircraft and with vibrations and signal interruptions on the last 158 aircraft affect the aircraft's mission effectiveness.
Flight controls in A-10 aircraft	Clearance for the aircraft cables and controls is not sufficient, and foreign objects may jam the controls. This condition may already have contributed to aircraft accidents.
Shelters for A-10 aircraft	Serious shortage of shelters in Europe might adversely affect maintenance of aircraft.
War reserve spare kits/ base level self-sufficiency kits	Shortages of war reserve re-replacement parts and components exist. These kits are needed to keep aircraft and their subsystems operational.

(951516)

PART III

Report No.: PSAD 81-17
Finding No. 1
Recommendation No. 1d
Status: Open 810129

The guidelines for improvements in supportability evaluation developed in the operational suitability study will be integrated into the revised acquisition policies that are being prepared as a result of the Deputy Secretary's project to improve the acquisition process. Current plans are for revised DoDD 5000.1 and DoDI 5000.2 to be issued for coordination by 30 September 1981. Following these revisions, an updated DoDD 5000.3 will be issued.

Estimated Completion Date: 1 March 1982

Report No.: PSAD 81-17
Finding No. 2
Recommendation No. 2a
Status: Open 810129

A review was conducted of the human factors specifications, standards, and handbooks. This review, formally documented in a report dated 29 June 1981, focused on the existing standardization coverage of the human factors areas addressed by the GAO report. Standardization projects are being initiated to address specific deficiencies identified in nine documents. These projects will be integrated into the Human Factors Area Standardization Program and will be monitored to completion as a normal part of DoD standardization activity.

Actual Completion Date: 1 September 1981

Report No.: PSAD 81-17
Finding No. 3
Recommendation No. 3a
Status: Open 810129

The contract for the Design Review for Quality Handbook was awarded in June and will be completed in December 1981. The Handbook, for use by Military Services and Defense Logistics Agency (DLA), should be available in February 1982 after coordination and printing.

Estimated Completion Date: February 1982

Report No.: PSAD 81-17
Finding No. 3
Recommendation No. 3b
Status: Open 012981

Defense Logistics Agency (DLA) is the task leader on the Quality Evaluation Program. The following schedule for accomplishing this task has been established: 1st quarter 1982 - Requirements and basic procedures for maintaining quality history files and preparations for computer programming will be completed; 3rd quarter 1982 - Program will be tested, coordinated and ready for implementation; and 4th quarter 1982 - Ready for initial implementation.

Estimated Completion Date: 31 December 1982

EXHIBIT #2

A STUDY OF THE
CONTRACT MANAGEMENT AND QUALITY ASSURANCE FUNCTIONAL ELEMENTS
OF THE
DEFENSE LOGISTICS AGENCY'S
DEFENSE CONTRACT ADMINISTRATION SERVICE COMPONENT

COOPERS & LYBRAND
October 1981
Contract No.: N00600-81-C-G818

PROJECT STAFF

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EXHIBIT #3(b)

EXECUTIVE SUMMARY

The Defense Logistics Agency (DLA) provides the Armed Forces with a wide variety of services, supplies, and logistics support. Contract Management and Quality Assurance, two of its major responsibilities, are carried out by the Defense Contract Administration Service (DCAS).

As part of an increasing concern over DCAS in the last few years, studies have been conducted by the Congress, the Defense Audit Service, and the Office of the Secretary of Defense. These studies have questioned the organization of DCAS, the value of certain DCAS functions, and the level of resources to be allocated for those functions. All of the studies made recommendations; some have been adopted by DCAS, but many others lack convincing support that would warrant their adoption.

Whatever the shortcomings of earlier studies, repeated questioning about the way DCAS performs its mission and the ways it manages its resources prompted DLA to retain Coopers & Lybrand (C&L), an independent contractor, to evaluate the way Contract Management and Quality Assurance functions are performed and to assess the current approach used to forecast and manage the personnel who carry out these two functions.

Overall, Coopers & Lybrand concludes that DCAS is performing in a creditable manner despite many major constraints:

- To a large extent DCAS is an organization whose workload is generated by a variety of DoD and military department buying offices. Its services tend to be "free" to the users and in times of austere resources customers tend to transfer more work and abuse this free service.
- The Defense Acquisition Regulation (DAR) specifies the functions to be performed and, in some areas, the procedures, thereby limiting flexibility for DCAS to optimize resource utilization. Past efforts by DCAS to obtain changes have been largely unsuccessful. Frequently the level of intensity of performance is mandated by the buying office, whether this makes sense or not.

- DCAS management information systems and management support processes do not adequately provide key senior personnel with the visibility and control necessary to manage a multi-billion-dollar enterprise.
- DCAS is constrained by the limited availability of certain professional skills and salary controls. Thus, it is often difficult to recruit, train, and retain qualified personnel. This, of course, has a serious impact on mission performance.

To deal with these conditions, this report does not recommend sweeping changes to the DCAS organization or mission. Rather, C&L's conclusions and recommendations are intended to bring about improvements that will enable DCAS to perform its mission more effectively and to use available resources more efficiently. Reliance on contractors is recommended a number of times in this report and it is vital that DCAS management be assured through DoD directives that this will not result in unwarranted criticism.

APPROPRIATENESS OF CONTRACT MANAGEMENT AND QUALITY ASSURANCE FUNCTIONS

The Executive Directorate for Contract Management is the focal point for all contract administration. It is responsible for ensuring that all items and conditions of the contract are met and that all regulations and statutes affecting government contracting are observed. Its functions are derived from the DAR and the contracts that DCAS administers. Specifically, they include:

- Contract administration
- Financial services*
- Property management

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* The payment function and related reporting were not included in the scope of this study.

- Systems and engineering
- Production surveillance and support
- Transportation and packaging
- Industrial preparedness

The Executive Directorate for Quality Assurance determines whether contractors have fulfilled their contractual obligations to the government for quality and quantity. The Directorate's functions include inspection and testing, verification of contractor's inspection system, and technical assistance for quality control programs. Quality Assurance personnel are responsible for:

- Acceptance of material based on quality requirements.
- Performance of product verification inspection and quality procedures.
- Evaluation of the effectiveness of contractors' quality control systems.

C&L concludes that the broad functions currently being performed within the Contract Management and Quality Assurance directorates are important and should not be substantially altered. When properly executed, these functions benefit the government by reducing or avoiding costs and risks. There are, of course, certain activities within a major function that are more beneficial than others. For example, within the financial services function, we identified 24 activities comprising the pricing area. Of these, 14 appear essential, 2 are not essential but produce significant benefit, and the remaining 8 produce limited benefit. Accordingly, when resources are scarce, the activities with the least potential benefit should be curtailed or stopped. As a principal part of this study, C&L developed a priority list of all functional activities within Contract Management and Quality Assurance according to potential benefit derived by the U.S. Government.

EFFECTIVE AND EFFICIENT MEANS OF ACCOMPLISHING THE CONTRACT MANAGEMENT AND QUALITY ASSURANCE MISSIONS

After identifying the potential benefit of all the functional activities, C&L evaluated DCAS field operations to determine if the major functions are being accomplished effectively and efficiently. Effectiveness measures the extent to which previously identified benefits are being realized. Efficiency measures the level of resources being applied to a specific functional activity, given the complexity and benefit of the activity.

CONTRACT MANAGEMENT

1. Contract Administration

Our review of the contract administration area highlighted the role of the Administrative Contracting Officer (ACO) as the team leader. In this capacity he has oversight of functional specialists who support him, such as Price Analysts, Production Engineers, Property Administrators, etc. He also performs certain tasks single-handedly as he is the only person authorized to commit the government, *e.g.*, issue contract changes. His tasks were reviewed on a sequential basis: preaward, negotiation, postaward, and contract closeout. By far the bulk of his time is spent in the postaward phase.

In reviewing the responsibilities of the ACO we identified 106 functions. For purposes of analyzing the significance of the functions and quantifying the workload of the ACOs, we developed four determinants of the level of effort required: complexity, frequency and intensity, degree of direct involvement, and benefits perceived. Ultimately, we identified five groupings or core functions that make up the majority of the ACO workload. Our overall assessment was that the contract administration function was being performed in an acceptable manner, but we noted some areas for improvement. The key areas cited are:

a. Increased Reliance on Automated Closeout

Currently, contracts are segregated upon receipt and reported in Section I of the Contract Administration Report (CAR) as either Part A or Part B contracts. Part B contracts are computer tracked while Part A contracts are assigned to specific ACOs. While this is an improvement over previous systems, we believe substantial efficiencies can be achieved, as well as improvements in the accuracy of the inventory of on-hand workload. We recommend the automated closeout procedure be extended to more of Part A contracts (unless overridden by the ACO) to reduce the administrative burden on ACOs.

b. Remove the Limit on Section I Part B Contracts

Firm fixed price contracts of $100,000 or less are currently classified as Part B contracts and are mechanically administered. We recommended the criteria for assignment of contracts be reviewed and that the dollar ceiling be eliminated. Since DCAS has a large volume of contracts that are completed in less than a year and are predominantly in the less than $100,000 category, there is a potential for wider utilization of computer-administered workload accomplishment.

c. Raise the Thresholds for Board of Review Consideration

Currently ACOs spend a considerable amount of time preparing materials for submission to the Board of Review for approval. We believe the thresholds should be reviewed and raised, especially in those cases where a relatively minor change is being effected on a large dollar contract. (The current threshold of $250,000 for modifications, orders, and work requests should be scaled upward.)

d. Provide Data Input Capability at DCASMA Level for On-Line Contract Management System

We believe that substantial time savings and other benefits would result from the availability of current and accurate contract information at the DCASMA level. The on-line contract management system scheduled for full-scale implementation later this year does not now provide for editing and updating operations at the DCASMA level. With adequate controls, there should be no difficulty arising from unauthorized access or manipulation of the data base. The benefits far outweigh the minor costs involved in establishing entry control procedures.

2. Financial Services

Our review examined the efficiency and effectiveness of the financial services function according to the four major components involved: pricing, systems reviews, the Cost Monitor Program, and financial analysis. These functions are all essential activities that justify the high level of resources applied. Our observation was, however, that the indicators currently maintained have limited utility for management. In addition, the organizational division of functions seems to prevent full utilization of resources. On balance, we concluded that an acceptable level of performance was evident, but that more efficient and effective use of resources could be achieved. Our principal recommendations in this area are listed below:

a. Reduce the Level of Effort on Pricing

When price analyses by DCAS personnel are based on DCAA audit reports, these cases should be processed with a minimum of effort, unless the Price Analyst's recommendations vary appreciably from the auditor's.

b. Increasing Threshold for Price Analysis of Cost-Plus-Fixed-Fee (CPFF) Proposals

CPFF price proposals under $5.0 million should be exempt from the requirement for field pricing reviews so that pricing personnel can be more productively utilized in areas with greater potential for payback to the Government.

c. Reduce Contract Procurement Systems Reviews (CPSRs)

Except for an initial review and necessary follow-up reviews, CPSRs should occur only on an ad hoc basis, taking into account the nature of previous survey findings, the contractor's business mix, and the extent and adequacy of contractor-sponsored efforts in monitoring his procurement system.

d. Limit Contractor Employment Compensation System Reviews (CECSRs)

Consideration should be given to limiting CECSRs to an *ad hoc* basis and assigning affected personnel to higher priority duties. In our view, the benefits achieved on this program are minimal and a discontinuance under the present criteria would involve negligible risk to the government.

e. Reduce Criteria for Insurance and Pension Reviews (CIPRs)

The regulations should be revised to permit the performance of CIPRs on an *ad hoc* basis, without regard to a threshold or specified frequency, taking into account the nature of previous survey findings and the contractor's business mix. Reports of CIPRs should contain only information essential to the work of ACOs.

f. Review Cost Monitor (CM) Program

Consideration should be given to converting all CM positions to Price Analyst positions under the operational control of the Financial Services Division. This should lead to more efficient coverage not only in the cost monitoring function but also in other areas of pricing as well.

g. Eliminate Financial Analysis Functions

Financial analysis should be eliminated as a separate function and integrated into the Price Analysis field. We believe the skill requirements for Financial Analysts are identical to Price Analysts and a consolidation will optimize use of scarce resources.

h. Reduce Level of Progress Payment Reviews

The regulations should be revised to exclude the Price Analyst from the processing chain for progress payment requests submitted by financially stable contractors. The present procedure is satisfactory for submissions from contractors who appear financially marginal. Currently 12 manyears are used in this effort, the majority of whom can be diverted to other work if our recommendations are accepted.

3. Property Management

Improvements in property management are possible by doing property surveys only for cause and by curtailing surveillance programs. The property management function is being adequately performed, but there is a potential for more efficient use of resources. The conclusions and recommendations regarding the property management function are summarized below:

a. Require Property Surveys on an Ad Hoc Basis Only

Except for property surveys of new contractors, the regulations should be revised to require property surveys on an ad hoc basis only, taking into account the nature of previous survey findings and the adequacy of the contractor's property control system. Consideration also should be given to eliminating formal survey activity when the contractor's own review effort is satisfactory. Under such circumstances, DCAS effort should be limited to an evaluation of the adequacy of the contractor's review.

b. Reduce Sample Size for Surveys

DCAS should authorize the use of the double sampling plan for all contractor property surveys. This authorization should be put into effect without delay, and the DAR Council should be requested to approve this deviation on a continuing basis until such time as the DAR is revised to permit the use of the double sampling plan. Based on a current department's test, significant savings can accrue to the government with little or no additional risk.

c. Reduce Monitoring of Surplus Property Sales

The regulations should be revised to end Plant Clearance Officers' detailed involvement in monitoring the sales of surplus property. The rates of return, about 5 percent of the original acquisition value, are relatively low and therefore do not warrant a substantial investment of the time of the Plant Clearance Officer.

d. Require Prime Contractors to Perform Subcontractor Property Surveys

Prime contractors should perform the property administration function for their subcontractors if the subcontractor is located within reasonable commuting distance, and when the subcontractor is not otherwise subject to property review by a government agency. DCAS should review the adequacy of the prime contractor's effort but should not do property surveys of subcontractors. In the final analysis the prime contractor is paid to administer his subcontracts.

4. Systems and Engineering

The systems and engineering function is being performed in an efficient and effective manner. Top priority is given to the technical analysis of cost proposals, cost/schedule control system monitoring, and value engineering functions. Engineering surveillance and support functions are performed as time, priorities, and resources permit.

Cost/Schedule Control System (C/SCS) reporting requirements may not be appropriate in all cases, although this judgment is made by program management in accordance with DoD Directives and not by DCAS personnel. Many of the program-managed contracts under surveillance by DCAS are for subsystems, and some involve subcontract reporting requirements. DoD recently doubled the dollar thresholds for a program to be considered a major system. Since this decision influences reporting thresholds there should be some future reduction in the resources needed to perform these functions.

The recommendations for systems and engineering include the following:

a. Reduce Monitoring of Subcontracts

DCAS should not accept the military departments' requests for monitoring responsibility for any subcontracts unless there is a compelling reason to do so.

b. Reduce Monitoring of Low-Dollar-Value Contracts

DCAS should consider eliminating the monitoring functions for low-dollar-value contracts (those under $10 million) by challenging the necessity to the purchasing office.

c. Improve Definition of Engineering Surveillance

The DAR 1-406 engineering surveillance functions should be rewritten so that they make better sense, contain better criteria for triggering required actions, and define a tangible end product.

5. Production

In general, C&L concludes that the production function is performed in a competent and effective manner. The most significant opportunities for improved management are in the transportation and industrial preparedness program (IPP) areas. The limited benefits and efficiencies of these functions can be attributed largely to deficiencies in computer support and to inadequacies of information. In addition, the industrial preparedness program suffers from a lack of commitment and uniformity of approach for which the military services are primarily, but not entirely, responsible. IPP personnel believe that contractors view the program as an opportunity to gain favored status with the government, rather than as a serious commitment to preparedness for wartime production conversion. IPP personnel also think that procurement officers tend to order surveys to meet internal quotas rather than legitimate requirements.

The recommendations for improving the effectiveness and efficiency of the production functions are described below:

a. Consolidate Industrial Preparedness Program (IPP) and Industrial Resource Management (IRM) Under Production

The distinction between IPP and IRM personnel and other production personnel should be eliminated. Surveys of contractors related to either the IPP program or equipment and tooling requirements should be performed by appropriate production personnel as required.

b. DoD Should Restructure the IPP Program

DoD should initiate an inter-service planning effort to identify the joint requirements for critical items and materials and to reflect accurately the current state of industrial technology. The product of this planning effort should ensure that quantity requirements of materials are identified adequately.

c. Revise Criteria for Issuance of Flash Notices

At the time a contract is assigned to an industrial specialist, criteria should be established for reported to the program office. These parameters should then be entered into the CAR data base and should serve as the triggers for flash notices. We believe that this approach will increase the significance of the flash notice system and reduce the volume of reports that are generated automatically but which serve no useful purpose. A criteria change to eliminate some reporting would require the cooperation of the Military Departments.

d. Reduce Scope of Transportation Function

Contractors should include the transportation costs of shipments to the destination specified in their bids.

Assign responsibility for small package delivery to contractors. This is a time-consuming and costly activity that does not appear to be cost effective given the generally low value of the shipments.

QUALITY ASSURANCE

The project team's review of the Quality Assurance (QA) function indicates that, generally, a satisfactory job is being done; however, the team identified several areas of concern.

Management should look carefully at what might be termed "the inspection orientation" of Quality Assurance personnel as opposed to the systems approach. The former approach is not only manpower intensive, but it also may result in a reduced level of quality, since many defects are embedded in the product and cannot be seen or measured. We believe a major emphasis should be developed to fully incorporate the systems approach concept.

A second concern is inflexibility. The Military Departments not only mandate to DCAS what should be done in the Quality Assurance area, but also how to do it. We believe the DAR and the governing directives should allow DCAS sufficient flexibility to determine the "how." In our judgment considerable manpower efficiency would result.

A third area requiring attention is the lack of a viable data system of MIS to help administer or control a 6,000-man function at thousands of locations throughout the United States. It is essential that DCAS adopt an automated MIS which would provide workload and resource allocation data for efficient use of Quality Assurance manpower.

The availability of personnel is also of concern. While DCAS appears to have a good training program, perceived ~~the~~ inflexibility to re-assign people prevents full utilization of manpower. Inability to recruit and retain technically competent people because of the low grade structure is a continuing problem.

The final area of concern, perhaps the most significant, is the lack of a realistic measure of the effectiveness of the Quality Assurance function, e.g., did the equipment work for its intended purpose? While there is a data-reporting system for defects, it is dependent solely on the initiatives of the Military Departments. It appears that only a small percent of failures are reported to the DCAS organization. We believe that DCAS should take the lead in developing a DoD-wide system for reporting failures so as to determine whether defective workmanship and materials and not the specifications are causing equipment to fail.

Specific recommendations are cited below in abbreviated form:

a. Increase Reliance on Certificate of Conformance (CoC) Shipments

The DAR should be changed to require the CoC clause in all contracts for noncomplex, noncritical items, and to give DCAS the discretion to determine whether CoC shipment is appropriate for complex or critical items. DCAS has attempted in the past to obtain this authority, however, the DAR Council was unwilling to provide this discretion. We strongly believe that such action would be in the best interests of DoD and DCAS.

b. Establish Better Uniformity of Mandatory Inspection Requirements

DCAS, through the Office of the Secretary of Defense, should seek to reduce needless variations in Quality Assurance and inspection requirements among the Military Services. DCAS should also seek to revise any excessive or unnecessary quality requirements. Instruction in Quality Assurance contract provisions should be included in all DoD training courses for contracting personnel.

c. Reduce Level of Effort Applied to QA in Selected Instances

QA surveillance should be reduced or eliminated for contractors that are established producers with good quality records. A system of spot checks should be instituted to take periodic readings of contract performance. Quality assurance actions should be held to the minimum necessary to ensure contractor compliance with contractual requirements. Staffing at resident activities should be adjusted as indicated by Quality System Reviews.

FORECASTING AND ALLOCATING DCAS MANPOWER RESOURCES

A primary objective of C&L's study was to determine the best methods for allocating available resources and projecting resource requirements for the purpose of formulating budgets. The first phase was an examination of the current approach to resource management. The second involved developing alternatives to the existing approach that would ameliorate the problems discovered in the first phase.

Based on our analysis of the current approach to resource management, we concluded that it does not fully satisfy the essential information requirements for resource-oriented decision making. The current system does provide some measure of operational control but it does not enable management to determine:

- What work is on-hand (other than total contract count) and the resources needed to accomplish such work in the future.
- The relationship between resources and workload as represented by contracts on-hand.
- The impact of resource management decisions.

Based upon our review we concluded that an alternative approach to resource management was warranted. As a consequence we identified four alternatives and evaluated each one. Three alternatives were considered and were rejected, as discussed below:

- Keep the current approach which has its faults but has not caused any serious mission degradation or mismanagement. This alternative was rejected for the reasons outlined above.
- Fully implement the DLA Integrated Management Engineering System (DIMES). This system is designed for operational control and it is unlikely that it can be augmented to satisfy the essential requirements of a complete resource management decision-making system.

- Develop a method of weighting contracts on-hand according to their impact on workload and allocate available resources to the field units according to their pro rata share of the total workload. This approach provides a framework for forecasting and allocating resources but does not include a means of operational control.

A fourth alternative was evaluated and determined to be best suited for resource management decision making. The recommended alternative -- the work forecasting, allocation, and control approach -- is briefly described below:

- When a new contract is received it is analyzed and the number of manhours required to administer it and perform Quality Assurance is estimated using predetermined standard time values for contracts having similar characteristics.
- As contracts are administered and Quality Assurance performed, manhours are tracked so that line supervisors and other management officials know whether or not the proper level of effort is being applied.
- Assigning a standard time value (i.e., estimated manhours required to service the contract) and tracking the hours worked against the estimated hours will enable managers to know:
  - Where resources are being applied.
  - What type of contracts are getting adequate resources.
  - What resources were used last month.
  - What resources will be needed over the next several months.
- Resource forecasting is done as it is now, except the forecast concentrates only on new contracts expected to be received. The estimated resources needed to service the new contracts will be added to the already known resources for the workload on-hand in order to calculate the resource requirements.

C&L believes the work forecasting, allocation, and control approach to resource management is a feasible alternative. When fully implemented this approach will enable management to:

- Better equate workload and resource requirements.
- Know how resoures were applied in the past and what are the future resource needs.
- Establish a framework to help identify the effects of resourcing decisions on workload quantity and quality.

Implementation will require considerable effort to develop necessary standard time values for workload and to reorient the existing reporting systems. C&L believes, nevertheless, that the creation of an effective and efficient resource management approach will fully justify the development effort.

Question 2. Does DOD maintain statistics on the number of Quality Deficiency Records (DD Forms 1715) that are initiated at least on a fiscal year basis?

Answer. No, DOD does not maintain statistics on the DD Form 1715. Only the DLA and Army utilize the DD Form 1715; the other Military Services utilize different forms. This form is used by the Government at the contractor's plant and statistics are maintained at the plant level. It is initiated because of lack of compliance to contract quality requirements on the product purchased or for a deficiency in the contractor's quality system or procedures. For example, DCAS personnel spent approximately 327,700 hours in FY81 working on corrective actions of this nature.

Question 3. Provide us with statistics on the number of quality deficiency records that were initiated during fiscal years 1980 and 1981 (separately) to include at least the following:

DOD Component; Contractor; Contract Number; Number of Quality Deficiency Records; and Name and Location.

Answer. The statistics are not available. For DLA-DCAS, this information would have to be obtained from the plant level records for some 20,000 contractors and screened by approximately 2,500 Government Quality Assurance Representatives (QAR). It would require approximately 12,250 hours over a 90 day period at a cost of approximately $137,500. The Military Services also maintain the data at plant level but the data would have to be screened at additional cost.

Question 4. Was "Method C" corrective action (as described in Section 4-502c of DOD Manual DSAM 8200.1) recommended for any of the above contractors during the above period (1980 and 1981)? Was the contractor requested to take Method C corrective action? Was the corrective action taken and if not, why? Please show this information by contractor as applicable.

Answer. Copies of Method C, which are mostly letters and replies which include corrective action, can only be obtained by the research required in the answer to Question 17. This information would take additional QAR and administrative time. The value of obtaining such information would be questionable because each contractor reacts differently upon a request for corrective action.

Question 5. Does DOD maintain statistics on the number of waivers requested and approved for non-conforming supplies?

Answer. DOD does not maintain statistics on the number of waivers requested and approved for non-conforming supplies. There is no control file in any Military Service or agency because waivers are granted by individual contract and the record is kept in each contract file.

Question 6. Provide us with statistics on the number of waivers requested during fiscal years 1980 and 1981 (separately) to include at least the following:

DOD Component; Contractor; Contract Number; Number of Waivers Requested/Approved; and Name and Location.

Answer. As stated in answer to question No. 19, DOD does not maintain these statistics. To provide statistics for fiscal years 1980 and 1981 would require a review of more than a million individual contract files.

Question 7. How often does a Material Review Board meet and for what purposes?

Answer. When a Material Review Board meets is usually established by internal contractor's procedures. The frequency may vary widely depending upon the volume of discrepant material to be considered by the Board. Usually, there is no set frequency. The purpose of a Material Review Board meeting is to review and make disposition of non-conforming material and establish measures for corrective action for future material being produced to prevent non-conformance.

Question 8. What findings and recommendations does a Material Review Board make? What enforcement powers are there to follow up on any recommendations?

Answer. The Material Review Board (MRB) reviews and makes disposition of materials which do not conform to drawings or specifications. It establishes controls for all supplies which are identified as non-conforming. The MRB is permitted to make three types of dispositions "accept as is" for non-conforming characteristics which do not affect "form, fit, or function," repairs for items which can be repaired, and rejection of items that cannot be "accepted as is" or salvaged by repair or rework. MRB can only be constituted by the authority of the Purchasing Activity or the Contracting Officer. A MRB is usually made up of qualified contractor quality assurance and engineering personnel. The MRB procedures established by the contractor are reviewed by the Government and the MRB usually has sufficient authority to make firm dispositions and implement adequate corrective measures on non-conforming materials. The final decision as to acceptance of non-conforming supplies is solely the prerogative of the Government.

Question 9. How many recommendations were made by a Material Review Board in fiscal year 1981 and how many of these were met. If any were not met, why?

Answer. There are no statistics available in the Government because the statistics are maintained by each contractor where MRBs are established and reviewed by the cognizant Government representative. Extensive research would be required to obtain such statistics.

Question 10. Does DOD know to what extent materials are shipped, received and accepted without required Government source inspection, if this is occurring? If so, provide us with information on this and steps DOD is taking or has planned to correct this problem.

Answer. When DOD requires that Government Source Inspection be performed on a prime contract it is always performed to the extent of resources available unless a determination is made by the contracting officer to have the supplies inspected at destination when such capability exists at destination. There is no way to determine to what extent exceptions are made at second and third tier suppliers to prime contractors but these supplies are generally inspected at the prime contractor's plant.

Question 11. Does DOD have statistics on the extent to which items are required to be reworked? If so, please provide this information.

Answer. DOD does not maintain statistics on the extent to which items are reworked at contractor plants. Usually these records are maintained by the contractor. The Government has little concern for this statistic on Firm Fixed Price Contracts. DOD is concerned on cost type contracts; however, the statistics are maintained and costed on a contract by contract basis. Normally reworked items conform to contract in all respects but in the event of a non-conformance the items are submitted to a Material Review Board for disposition.

Chairman **Roth**. We now call upon Gordon Rule, who held the position of Director of Procurement Control and Clearance Division, Department of the Navy, now retired.

Mr. Rule, I understand that you do not have a written statement but do want to speak extemporaneously on the question of procurement. Please proceed.

TESTIMONY OF GORDON W. RULE, DIRECTOR OF PROCUREMENT CONTROL AND CLEARANCE DIVISION, DEPARTMENT OF THE NAVY (RETIRED)

Mr. **Rule**. Thank you, Mr. Chairman, and good morning to members of the committee. I do have some notes, Mr. Chairman, that I would like to talk from. I would also like to say the atmosphere here today has me a little concerned. I mean by concerned, I am not used to such an attitude, an atmosphere of policy, management policy. That is about the tenor of what we have heard this morning. When you invited me so kindly to come and talk, I don't know whether you realized my experience has always been on the operating level of procurement. I have negotiated contracts, I have reviewed contracts, I have signed contracts, but I have never made policy per se.

This bothers me to sit and listen, as I did this morning. I often wonder how these wonderful policies get down to where I used to work on the operating level. The term management is a term that I find hard to assimilate. Management in the procurement process when I was in the Navy, management means control, to me. If I want to manage the procurement process in the Navy, I want to control it. The only way that I could control it was to keep it centralized, not delegate as the DOD 31 points are recommending. They are recommending more delegation and minimization of reviews. I would like to tell you that in 1941 when Mr. Forrestal was Secretary of the Navy, he did two things. He found that he was getting a lot of procurement documents for execution which had never been reviewed by anybody that were coming straight to him from the procuring activities.

In those days they were called bureaus in the Navy. And he would get these documents directly from the bureaus and he decided he wanted everything reviewed at that time in 1941 over $300,000. That is a long time ago. So he set up the clearance branch that I was to head up for 15 years. This group actively reviewed proposed contracts before they were executed to assure Mr. Forrestal that the business aspects of those contracts were prudent, and this was a function that was not very much liked by the bureaus, as you can imagine.

Many efforts have been made since 1942 to do away with that function Mr. Forrestal established. If a review was thought desirable, the Syscoms wanted it back in their own shop. These efforts were unsuccessful because it was recognized that these efforts were basically to get less control rather than more. Mr. Forrestal did one other thing in 1941, he established the civilian office of General Counsel. At that time, not only did he have no business review of documents, but he had no civilian legal staff to advise him. He only had the JAG Office and they are, as you know, military lawyers so he established the Office of General Counsel and put Mr. Struve Hensel in charge of it. That is the background of the function which I headed, Mr. Chairman, and members of the committee.

I find it philosophically somewhat antithetic to what Mr. Forrestal was doing and wanted in DOD to now recommend further delegation and fewer reviews, a minimization of reviews because that to me means less control whereas I think were I in the Department of Defense with all these billions upcoming, I would want more control rather than less.

I suggest that that would be more acceptable to the taxpayers.

Mr. Chairman, I am a procurement professional and I want that understood, and a procurement professional to me is a person who knows how to make a fair contract, fair Government contract, and does, in fact, make fair Government contracts despite all opposition. And believe me, on the operating level, there is plenty of opposition to making fair contracts. It was mentioned this morning the contract for the Trident submarine. That was an unfair contract. I disapproved that contract because it was unfair. My position was not maintained. I was overruled, as I have a perfect right to be. Anybody over me can overrule me and I respect that.

But that was and is an unfair contract. As a procurement professional, the biggest point I can make to DOD or to anyone else is that we have got to make fair contracts. I wrote a book on the "Art of Negotiation" in 1962. This fair contract hasn't just become fashionable with me lately. In 1962, I wrote in this book:

> If as an intellectually honest man you conclude that a point, a position or indeed an overall objective is not fair and reasonable to the other side, you would be well advised to make some adjustment because you can be made to look ridiculous later by a smart negotiator on the other side and you run the risk of doing irreparable harm to the overall negotiation.
>
> Moreover, anyone who deliberately negotiated an unfair or unreasonable agreement or contract is only asking for trouble at a later date. You cannot take advantage of other people in a contract or agreement and expect amicable relations thereafter. It will come back to haunt you and you will have done a great disservice to those you represented.

We have done that many times in the past. We not only have made unfair contracts, we then have harrassed the contractors. I can show you where admirals have written to committees on the Hill saying they consider the negotiation of a government contract an adversary proceeding. Nothing could be farther from the truth. An adversary proceeding, the best example, I suppose, is a case in court where one person wins and the other person loses. That is not the objective or the philosophy of a fair government contract. How do the DOD expect by their so-called management principles—I don't care if it is 31 or 51—to take care of situations like that.

A fair contract also, gentlemen, must give the contractor an opportunity to make a fair profit, a reasonable profit, providing he gives the Government the three things the Government is always buying; namely, a quality product, on time delivery, and at a reasonable cost. Not many contractors in these United States give those three things. There are quite a few of them that give us two, will give us pretty good reliability and pretty much on time, but not the reasonable cost. Very few give us all three.

If they do, if they even give us two, I think they are entitled to a fair profit, but if we ever found a contractor that gave us all three, I would want to pass a special claims bill to pay them more. But when I look at that—I have been several times on the *Nimitz*—when I look at that ship with 6,000 men inside her and think that the builder made 2-percent profit, you look at that ship, you think anyone who could build her ought to be entitled to 10- or 15-percent profit, no question about it.

But, again, making unfair contracts. When Newport News proposed to build that ship, they proposed 43 million man-hours to build her. The powers that be in the Navy at that time, and I will mention no names, insisted that she could be built for 36 million man-hours. That is what went in the contract. And when the ship was finished, Newport News had spent 44 million man-hours. There, again, it was an unfair contract. We cut the man-hours, we negotiate that way. Again, I say how DOD will manage that situation I just don't know. I would like to make it clear the Navy to me, the Navy is not in Washington, the Navy is the fleet and the fleet is not in Washington. But the Navy has two sides that I think should be recognized. One is the user side, and that is the fleet, and the other is the producer side. And the producer side is where the taxpayers money is spent to obtain what the user side needs. My work has always been on the producer side of the Navy.

It is interesting that on the user side of the Navy, there is very, very adequate accountability and discipline. If a rowboat runs aground on the user side of the Navy, there will be a board of inquiry the next morning to find out what happened. On the producer side, contra, if a $100 million contract is screwed up, there is no accountability, there is no discipline. Mr. Carlucci's 31 statements are prefaced—it is item 1, "Greater delegation of responsibility, authority and accountability." Greater accountability assumes that there is some accountability. I think that is one of the things that your committee should concentrate on and insist upon.

I think you should take a long look at the accountability on the producer side of the Navy. That is where the money is spent and try and relate that lack of accountability, if you please, to the very fine accountability and discipline on the user side in the fleet. They have got it, we don't have it.

All naval officers are well trained. To do what? To fight. That is what they are trained for and they are trained well. I believe the officers in the other services are equally well trained. But training a naval officer to fight is a far cry from educating him—there is a difference between training and education—to deal with the prudent spending of the taxpayers' money to get what the fleet needs.

The Navy has what are called, and you all have heard the term many times, Navy regs. Navy regs means that if you have one-half more stripe on your sleeve than someone else, you tell him what to do, you give him an order and that is Navy regs. I had a very interesting experience, once, with a four-star admiral who was Chief of Navy Materiel who came from the fleet. He sat in a meeting one day at one of his staff meetings and a vice admiral from CNO complained to him that he had been unable to get certain information that he wanted from a project manager. This four-star admiral, the Chief said, "When was the last time you read Navy regs? You know that if you have one more stripe than that project manager you can demand it."

When that meeting was over I went to the admiral and said, "Admiral, you cannot run procurement by Navy regs. You cannot dictate what people should do by Navy regs. You are an executive now in addition to being an admiral and you have got to act like an executive and consult with people and talk to people before you make a decision." And his answer was the most refreshing and honest answer I have ever received. He said, "Mr. Rule, Navy regs is all I know." And that is very true. That is all he did know. He had never been educated, if you please.

He was an excellent naval officer, but he had never been educated to come into the Chief of Naval Materiel's office and deal with the Grummans, and the Littons, and the General Dynamics. He had to feel his way. He frankly admitted all he knew was Navy regs, but he was a good man and he learned fast and he learned to handle the Grummans, the Littons, and the other people.

There again, management, how do you manage that sort of thing?

I do suggest with respect to these DOD 31 points that the more you delegate and the more you minimize reviews, such as Mr. Forrestal wanted, the more you minimize those things, in my opinion you are sending a signal to people, mainly the military who are not educated in procurement, you are sending them a signal that what we want is the hardware, just get us the hardware, don't worry about the costs, don't worry about accountability, just get us the hardware. I think it is the wrong signal to send. I think they ought to be very careful about how they delegate without these reviews that Mr. Forrestal put in place in the Navy. That review procedure he originated is called in Navy contract law the check and balance system. That is what it is intended to be, a check and a balance. I had thought and at one time discussed it with the GAO that possibly it would be a good idea for the Department of Defense itself to put in such a review procedure for all contracts over whatever dollar limit they wanted to set.

But to have some kind of review other than just pushing it off and delegating.

I have written here some suggestions for the committee which being gratuitous you don't have to give a damn about, but I would suggest that you concentrate on fundamentals. And not spend too much time on what I call warmed over perennials.

One of the things that I think is very fundamental that you should look at is the proper place of the military in the procurement process. I don't know who has ever looked at that. Mr. Carlucci said this morning that DOD is a military organization. Sure, and he said they were trying to perpetuate civilian control of the military and that is fine, he should.

For many years I have thought that the military place in procurement is clarified by four words, what, when, where, and how. What the military needs are and when they require them is a military function. That's requirements. That is the what and when. Where it is obtained and how it is obtained is a civilian function in my opinion. That is where you are spending the taxpayers money.

The what, when, where, and how. And we used to have that distinction in the Navy but I am sorry to say they have managed to get it around today to where the project manager—this changed with the advent of the project manager—now is saying the what, when, where and how. That I don't think is right. But that is what is being done today, with little or no accountability.

I understand the attitude of these very well-trained naval officers. They want the best, the most and the hell with cost. They haven't been trained to think of cost. That is not their background. Some of them more so than others. But did you ever hear an admiral give a speech on cost savings? I never did. I never saw a speech by any military man just on cost savings to the taxpayer. I would love to see one. I would love to see one actually by the Secretary of the Navy and the other civilian secretaries. But that is rare also.

The thing that puzzles me or that brought this again to my attention pointedly, just recently, was one of the outstanding recent Chiefs of CNO, Chief of Naval Operations, has made the statement, "I am telling you the military people don't have any responsibility in the procurement process."

Senator **Cohen**. Who said that?

Mr. **Rule**. Admiral Moorer. "I am telling you the military people don't have any responsibility in the procurement process." Now that statement just shocks the hell out of me. I thought they make the decisions and in the Navy now that they have what is called the unilinear system whereby everything heads up to the CNO. It used to be the bilineal system. There used to be an admiral in charge of the Materiel Command who was of equal status with the CNO. They changed that, they made it unilinear.

Now everything heads up to the CNO and on the organizational chart he is responsible and yet Admiral Moorer says "I am telling you we don't have any responsibility." Now that needs clarification. I don't know who is right but I would think it is pretty fundamental that you Senators with an interest in this subject would want to find out what gives in this area.

Because it all goes back to the point, the other important fundamental point I tried to make of accountability. We have got to get accountability. I don't know what it will take.

I was interested in the comments of Mr. Carlucci this morning when he said a couple of times they were trying to stimulate people to give better estimates and they were trying to stimulate people. I know how you stimulate people. If they don't give better estimates over the period, fire some of them. That is what industry would do. You know what I am talking about.

Senator **Cohen**. Mr. Rule, could I interrupt you and ask you whether or not there is a difference in the military procurement field from when you worked in the Navy. Would it be the case that 10 years might go by on a system before you found out the original cost estimates were totally underestimated by 100 percent? An administration may have come and gone, in the meantime, and that person who originally negotiated the contract may no longer be in the service. Was it difficult to trace accountability down to the lowest level as it is today?

Mr. **Rule**. Well, sure, they all count on that, "I'll be gone with my distinguished service medal;" "I will be gone." I have often thought when they find these things out ultimately, they should call them back and take that DSM back.

Let me say just in conclusion, Navy procurement used to be the best of the services. It was recognized that it took us longer to make contracts but studies have shown they were the best contracts. Now that has changed. I think mainly it changed as a result of so-called over-optimism in bidding and estimating, a term which I deplore. Incidentally, I will digress——

Senator **Cohen**. How about over-optimism and inflation?

Mr. **Rule**. Over-optimism. When the Navy settled with Electric Boat $700 some odd million for the 688 class submarines, the Secretary of the Navy was asked why and his statement is priceless. "On the basis of assumptions that history would later portray as over-optimism, the 688 program was construed to be merely an evolution from the 637 class." "On the basis of assumptions that history would later portray as over optimism."

When I see that term over-optimism, I know its a coverup and it isn't an accidental coverup. Over-optimism is—well——

Senator **Cohen**. Mr. Rule, are you suggesting that there is a deliberate miscalculation or simply gross neglect when you say it's a coverup? What do you mean by that?

Mr. **Rule**. I think it's a coverup when they use the term.

Senator **Cohen**. Coverup for what?

Mr. **Rule**. A coverup for mistakes that have been made, the mistakes mainly being unrealistic estimating. And why the Navy can't——

Senator **Cohen**. In other words, by using of this word "over-optimistic," they are covering up what was either gross inadequacy or underestimation of costs or underestimation of inflation. We are still dealing with code words, aren't we?

Mr. **Rule**. I will agree to that. Let me just say two more things. I wrote a letter to Secretary Weinberger and Mr. Carlucci in January. One of the things that I recommended to them and I recommend that you look into, is the desirability of having witnesses before the congressional committees—in uniform or out of uniform—before the Appropriations Committees, all the committees, who come up here and talk about billion dollar programs be required to testify under oath. If you have an accident with your car and you can't settle it and you go down to traffic court to testify on that accident, the first thing you have to do is hold your hand up and testify under oath. But not on a $10 billion contract, you don't have to come up here and testify under oath.

It won't be a panacea if they do so testify, but it might just make some people think twice and I think the taxpayers would appreciate it.

Senator COHEN. Thank you very much, Mr. Rule.

Senator PRYOR. We have to go. Is there any way we can talk you into coming back into Government work into this area?

Mr. RULE. I put in to stay in the Government but there were certain admirals who had had enough of me. So that didn't go through.

Senator PRYOR. I would like to say thank you very much.

Senator COHEN. The committee stands in recess for 5 minutes.

[A brief recess was taken.]

Chairman ROTH [presiding]. The committee will please be in order. Mr. Rule, if you could return, I do have two or three questions I would like to ask you. Perhaps they were asked in my absence. But I was much struck by your statement on accountability. It does occur to me that the captain of a ship who has an accident and is found liable, finds his career badly damaged. What about the program manager? Is he judged by his ability to keep costs under control? One of my concerns is that every new administration, and I think sincerely, wants to do the best they can, but when you talk about performance, when you talk about schedules, when you talk about costs, I have a feeling that costs probably come in third.

The program director will be criticized a lot more for failure to deliver or failure of performance than he will for overruns, and perhaps one may argue as to whether or not that is without merit.

But how do we get the program directors and everyone else in the line of command or channel of management cost conscious?

Mr. RULE. I do think that you were out of the room when I made this statement and it was not facetiously made. One could fire somebody once in a while. That is what industry does. That is really accountability and discipline.

Chairman ROTH. Are the program managers evaluated on the basis of their all-over performance, or on the basis of cost performance?

Mr. RULE. I am sure they are evaluated and get fitness reports the same as other officers. To what extent the cost of their project is equated in that, I don't know.

One of the things that happens is that project managers, Senator, they are most concerned about their money. Don't misunderstand me. There are a lot of programs competing for the dollars available and one of the biggest concerns of a program manager is that he can wake up tomorrow and find the money that he thought he was going to get taken for another project with a higher priority.

And that is one of the things the project managers do that is unfortunate. They continually, because they want to know their money is there, they like to make fixed price contracts. They don't like cost type contracts because a cost type contract has no ceiling on it and they may have to go back and ask for more money later and they feel rightly or wrongly that if they have a fixed price contract, they have a cap on their funds and they know, they feel that that protects them. It doesn't always. It just means many times they have made the wrong type contract.

Chairman ROTH. One last question and that is this question of dual sourcing. Do you feel as a result of your experience that competition could be better utilized in the production of some of these major systems? I understand your point of fairness.

Mr. RULE. That is a tough question, Senator. You know, strangely enough, one of the most difficult decisions to make in the Navy, and we had to make them in my shop, one of the most difficult decisions was to insist that we stay sole source and that we don't get competition. There were many times when people wanted to get competition, wanted another source for the same article, and when you looked at it and realized you would have two types, that weren't interchangeable, you would have two manufacturers making the same thing, two sets of spare parts, etc. It sometimes was hard, but it was right to stay with a sole source.

I am a believer in competition. I think some of the things we do we could do differently. I am opposed to the degree in which we indulge source selection, the source selection procedure for giving contracts. I think there is a better way. The source selection procedure means that the Government is looking for the best contractor to make a particular piece of hardware, the best in the United States. I think that is wrong. I think we don't always need the best and when you determine who is best by a scoring system of points, it is always subject to being gimmicked. There is usually more than one manufacturer in the United States that can satisfy the Government's requirements. It was pointed out this morning nobody else can build a nuclear carrier or a Trident submarine, but normally I would like to see us instead of having the source selection system, where everybody is an officer—the head of the SSEB is an officer, the head of the SSAC and the Source Selection Authority himself, they are always officers and the military is in control.

I just think we can go to a system of two step negotiation where we say to the companies, here is what we want, here is the minimum requirement. If you can qualify for that minimum requirement, you can satisfy the Government's desires in this procurement and you usually will get more than one who can meet that requirement.

In step 1, you do that. In step 2, let them go ahead and bid it and if you think they are bidding in—all this talk about buy ins, Senator, I don't buy, I don't agree with because the contracting officer has to make a determination that this contractor is a responsible contractor for this procurement and if he thinks that contractor has bought in, he ought not make that determination of responsibility. It takes guts but they ought to do it.

The trouble is, how do you know he is buying in? You have lousy estimates to start with, so if you balance his bid against a lousy estimate, you don't know if he has bought in or not. But if you had some sensible way to determine that he was buying in, all the contracting officer would have to do would be to make that determination of responsibility. Let me say just one other word on buy ins.

When I was in uniform, we went out and got proposals to build a couple of ships and Todd Shipyard out in Seattle sent in a bid where they broke the bid down and it said, the last line profit, they said minus 20 percent. They made their bid, they were reducing it 20 percent. I said that's a buy in.

We know its a loss contract. We can't do business with anybody that is telling us in advance that it is a loss contract. I was persuaded by some people after discussing it at length that it was all right to give Todd that contract. It was a management decision. If the company could stand that loss financially and they needed that work to keep the nucleus of their shipbuilding force in that plant active and they were willing to do that at a loss, I was persuaded that it was perfectly all right. We gave them the contract. So there are different sites to it. If a contractor wants to take a loss and he can afford to do it, its not always bad.

The worst part is when the Government itself forces a man to take a contract to meet a budgetary figure. That is much worse than a contractor buying in voluntarily.

Chairman ROTH. I guess the concern is that sometimes they buy in and expect to make it up later.

Mr. RULE. The way we change things, we won't ever freeze a design, Senator, and say here is what we want, now go build it. That is what the Russians do.

Chairman ROTH. Isn't that one of the major loopholes, one of the major problems with increased costs?

Mr. RULE. Of course, we change, change, change, change. And the more you change, that is the worst part about what they call concurrency. When you are designing something, developing it and producing it at the same time. That is what you are always doing with a ship.

Chairman ROTH. We have two more witnesses so I should proceed. I thank you for coming here. It may be that some of the Senators, including myself, may have additional questions.

Mr. RULE. I really appreciate your asking me, Senator. I hope in some small way I have helped the objectives of the committee and if I can do anything more, let me know.

Chairman ROTH. Thank you very much. You have given us, I think, some very valid insights that have not been presented here before.

[Responses to written questions submitted by Senator Roth and letters submitted to Secretary Weinberger and Senator Roth follow:]

ARLINGTON, VA., *December 17, 1981.*

Hon. WILLIAM V. ROTH, Jr.,
Chairman, Committee on Governmental Affairs,
U.S. Senate, Washington, D.C.

DEAR SENATOR ROTH: Responding to your November 9, 1981 letter (received by me on 24 November 1981), I am pleased to supply the enclosed answers to the questions contained therewith. Also enclosed is a copy of a letter to SECDEF Weinberger which you and your staff may find of interest.

If I can be of future assistance, please let me know.

Sincerely,

GORDON W. RULE.

Enclosures.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

Question 1(A). Do you believe it is impossible to competitively bid contracts for major weapons systems?

Answer. It is possible, but only under circumstances which are most unlikely to occur, given the basic philosophy and flaw in weapons systems procurement by the military in the United States that is epitomized by the trite, albeit accurate statement, "there never is time to do it right the first time, but there always is time to do it over."

In short, reasonable times are always telescoped/accelerated into unreasonable time schedules for performance and this costs the taxpayer a great deal more money. More specifically, the Navy contract with EB for the lead Trident had a Best Effort delivery date of December 1977 and a Contract Guaranteed delivery date of April 1979. Newport News proposed a delivery date of May 1981 and EB actually delivered the ship in October 1981.

The necessary circumstances for genuine price competitive procurements are:

a. Know what it is we want to procure and fully inform bidders.

b. Have reasonably accurate estimates of cost.

c. Have an authenticated data package to give to potential competitors upon which to bid.

d. Freeze the design as the Russians do.

e. Negate or absolutely minimize changes.

f. Assure that the proper type of contract is utilized that is fair to both parties.

g. Have pre-production or pilot production models to assure "Fly before Buy."

h. Require all essential documents relating to a project to be executed under oath for traceability of accountability.

Without these circumstances existing, the result will always be to a greater or lesser degree, some element of concurrency of development and production which invites changes—and again greatly increased costs.

With an authenticated data package and pre-prods you progress intelligently through the necessary phases of design, development, and testing into production without concurrency. That is what DSARC was supposed to assure.

But make no mistake, to do it right the first time requires more time than the Services will allow. The emphasis from topside and the Project Managers in the Navy is, get the hardware to the fleet, we'll retrofit and fix it later.

An interesting result of this constant insistence upon haste and phony delivery dates is that once the hardware is in the fleet on shipboard, the manufacturer will have his technical people (tech reps) riding the ship to determine required fixes for the hardware and the necessary retrofit kits to make the hardware operate efficiently will then be sole source for the manufacturer.

In short, it is not unusual for the manufacturer to make more money out of less efficient hardware that he produced and the Navy accepted than he would make if the hardware was properly operable when originally delivered.

One last comment on the proper way to obtain genuine competition. I have mentioned, as one of the essential ingredients, an authenticated data package.

Very few people realize that the basic objective of R&D is not production, it is the obtaining of an authenticated design data package suitable for competitive procurement. Most, if not all, R&D contractors don't like that truism, they much prefer the designer/first production concept which they then use to obtain additional production runs. This designer/first production concept in theory requires the obtaining of the data package at the end of first production so that there can then be genuine competition for subsequent production.

The problem with this concept is that the designer/first producer knows that if he delivers the required data package in timely manner, he may be out in left field on subsequent production runs. All he has to do is to hold back and not deliver the data package—he is not penalized for so-doing—and thus obtain additional contracts for production of the needed hardware.

So round and round we go, and where it will end nobody knows, but we all know one result is that the taxpayer gets you know what, the Project Manager who is a Captain gets a DSM and promotion to Admiral—now Commodore.

Question 1(B). Would any money have been saved on this very expensive program if it had been competitively bid?

Answer. Only two shipbuilders, EB and Newport News, could build the Trident submarine. Both were invited to submit competitive proposals to build the lead Trident with option prices for three additional ships on a fixed price incentive (FPI) basis. Both did submit proposals, EB on a cost-plus-incentive-fee (CPIF) basis and Newport News on a cost-plus-fixed-fee (CPFF) basis. When EB and Newport News submitted their competitive cost type proposals, there was only a difference of $6,303,385 in their prices, without escalation.

The Navy—the Rickover Navy—decided for reasons but known to Admiral Rickover, to lean on EB to change their proposal from CPIF to FPI. EB did so and knowingly accepted the wrong type of contract for a quid pro quo of four ships with a contract value of approximately four billion dollars. (What company today would turn down such a deal?) Newport News was said by the Rickover Navy in writing to be "noncompetitive."

At this point, no one can answer the question other than by indulging speculation. Since the award of the contract for the lead ship and three option ships, the contract has been gimmicked to put all four ships under a single target cost and a single ceiling so it will be years before anyone knows how much the first and the first four Tridents will cost. Moreover, the Navy does not know if EB is going to submit a claim on these four submarines. Rickover says they will; I agree with him, but no one except perhaps EB knows for sure. Only time will tell.

When you start a procurement by asking two or more competent contractors to bid competitively in the hundreds of millions or billions on something not designed, developed or tested with all the inherent unknowns, known unknowns and unknown unknowns involved, it probably is unrealistic to speculate that money would or could have been saved had we done it another way.

It is true that there is a rule of thumb in Government procurement which says that competition saves roughly 25 percent in cost. I agree with that rule of thumb, if you know what you are buying and can tell potential bidders fairly precisely what you want and give them a data package or good specification of what they are asked to bid on competitively. Otherwise, in my opinion, the alleged competition is window dressing and a statistical game.

Question 2. Is there a great deal of information, such as differing cost estimates and specific aspects of contracts, which is consciously hidden from Congress and the public so that a new weapons system, even if it is problem ridden, can be assured of funding? For example, in the case of the Trident program it appears that additional information on the type of contract the Navy was considering using for the program may have changed the acceptability of the program to the Congress and the public.

Answer. This question seems to assume that if every bit of information—favorable and unfavorable—concerning Defense contracts and programs were accurately revealed, the Congress and the public might take action to show their displeasure, etc. if a program is in trouble.

I suggest this is a specious assumption. In my opinion, the public doesn't know or care enough to give a damn and the Congress as an integral part of the existing military-industrial-Congressional complex is quite knowledgeable of the way the system works but has no desire or intention of taking the necessary oversight action to find out the truth and act accordingly.

Of course the Services—and thus DOD—consciously keep as much unfavorable information from the Congress as they can. What written and oral information Congress does get is never required to be under oath, as full and complete, etc. The Congress could remedy this situation immediately if they wanted to do so, but they don't want to as is so painfully obvious.

I once heard a Navy Captain Project Manager address a class of potential project managers at a Navy school and describe for the group what he termed "Graceful Cost Growth" for use in preparing the SAR's to DOD and the Congress. This concept never allows a report to say categorically the project, or a part thereof, is in trouble—it merely advises that there are barely perceptible signs on the horizon that down the road a certain feature may encounter difficulty, etc. This procedure is followed in subsequent SAR's until it is much too late to turn back or cancel the project.

That Navy Captain made Admiral. He did not advocate or recommend outright dishonest reporting, merely disingenuous reporting.

Congressman Charles F. Bennett of Florida, the Chairman of the House Armed Services Subcommittee on Seapower, is an honorable and very fine man. He neither is, nor claims to be, a zealous overseer of the Armed Services. "The main function of

Congress is to get whatever national defense is needed," he says. "Oversight is not a major function."

It is suggested that Mr. Bennett's stated position is shared by most of the senior members of the Congress, especially those on the Armed Services Committees, with the result that those persons inside and outside of the Congress who seek to bring about honesty and accountability in defense procurement on behalf of the taxpayer are literally whistling Dixie and stand no chance of being successful.

Unfortunately, I am among those individuals who know from experience that you cannot beat the existing military-industrial-Congressional complex in this country.

Question 3. Would you say it is fair to characterize almost every major DOD program as having a built-in cost overrun? Is the Trident program unusual in this regard? Did you ever work on a major weapons program which was built under cost?

Answer. I think it fair to say that the GAO has studied all major defense programs and their findings and conclusions are available to the Congress.

Here again, Congress knows what is going on but is such a part of the exercise that they will do nothing about it but talk.

I never worked on a major weapons program which was built under cost (I assume the question means under estimated cost).

Question 4. Do contractors, in your opinion, have any incentives to reduce costs to the lowest possible level? Do contracting officers have any incentives?

Answer. Contractors will reduce costs if they thereby make more profit. For example, under a firm fixed price contract, the contractor retains every dollar above the fixed cost.

Contracting officers today are motivated to try and get one of the incentive awards which today are fashionable. To do so they have to please their superiors and not necessarily negotiate contracts in the best interests of the taxpayer. Pride of work has been replaced by cash awards for doing what they are supposed to do. This applies to all levels of the Executive Branch, especially the double dippers.

Question 5. Are the problems which arose under the Trident program, the excessive costs, the use of inappropriate types of contracting instruments, unusual in other DOD programs? Are there other programs with which you are familiar which had similar problems?

Answer. The problems that arose under the Trident lead ship contract were, in my opinion, caused by the wrong type of contract. The ultimate costs and delivery date of the ship may actually be realistic. The problem was caused because Admiral Rickover told the Congress and the public that the phoney target cost of the fixed price type contract and the phoney delivery dates were credible when he knew they were not and could not possibly be met.

Every Navy nuclear ship contract has been the subject of controversy and overruns because the Rickover Navy insisted upon unfair provisions of those contracts. The outstanding example are the SSN 688 contracts which already have cost the taxpayers approximately one billion dollars in P. L. 85-804 settlements with EB and Newport News.

ARLINGTON, VA., *January 26, 1981.*

Hon. CASPAR W. WEINBERGER,
The Secretary of Defense,
The Pentagon, Washington, D.C.

DEAR MR. SECRETARY: As a defense procurement specialist and taxpayer, I give you my views on the curbing of waste and mismanagement in the Department of Defense. (Copy of this letter to Mr. Carlucci.)

President Reagan has repeatedly insisted that his goals for spending cuts could be achieved by eliminating "waste, fraud, abuse and mismanagement" from federal programs.

Former Secretary of Defense Brown, at a breakfast meeting with reporters on 16 December 1980 is quoted as saying that perhaps another $5 billion of waste in military spending could be eliminated each year, but warned that built-in political pressures hamper the sound management required to assure efficient spending of the taxpayers' defense dollars.

In my opinion, both of those men are right in what they have said and it is now up to you and Mr. Carlucci to make the President's stated objectives a reality, to the greatest possible extent.

It can be done gentlemen, if you have the guts to take the necessary steps. Difficult? Yes. Strenuous opposition? Yes. But it must be remembered that this is not a popularity contest.

Any genuine, realistic effort to eliminate or minimize waste, abuse, mismanagement, etc. in the federal government—and particularly the Department of Defense—must (i) be bottomed on a clear understanding of what is inherently involved and (ii) must eventuate in a well thought out program designed for that purpose. Without a clear program which maintains high visibility, nothing of substance will result.

It is submitted that waste results primarily from two elements, (i) a lack of constant cost consciousness, which is basically a state of mind and (ii) an almost total lack of any accountability.

It should be recalled that former Secretary of Defense McNamara instituted a Cost Reduction Program which set goals and required all elements of DOD to report periodically on their efforts to meet those goals which were revised periodically. That was not a perfect program, but it did provide an intelligent method of assuring some cost consciousness—and thus some cost discipline—on a continuing basis in the DOD. That program was much maligned and died.

No such program exists today and indeed there is evidence that an antithetic mentality has become fashionable in the very places the taxpayer has a right to expect exemplary conduct.

More specifically, it is not too surprising to find the military almost devoid of demonstrable cost consciousness and accountability for mistakes or poor judgment decisions, etc.

Contra, it is most surprising, wrong and even reprehensible for a civilian Secretary of the Navy to testify before the Senate Armed Services Committee as follows: "Senator, I have said many times there is nothing wrong with our Navy that money won't fix."

That mentality or philosophy by a civilian Secretary is patently antithetic to cost consciousness, sound management or elemental understanding of how the taxpayers' defense dollars should be spent prudently.

Until or unless proper cost consciousness is instilled as a state of mind throughout the Department of Defense, at all levels, civilian and military, the desired objective of President Reagan to eliminate waste will continue to be wishful thinking, in my opinion. That is why a well thought out program is needed on a full time basis to drive home cost consciousness.

Even assuming a high degree of success in devising such a program, it is suggested that it will very probably prove unsuccessful without the required essential element of accountability from top to bottom in the DOD. Accountability and responsibility are synonymous, but it is my experience that much more attention is devoted to the practice—as expertly perfected by the military—of CYA. (Many examples are available.)

It has also become fashionable in DOD to invoke the excuse "there is enough blame to go around" to negate any attempt to determine accountability for mistakes, etc. Lessons should be learned to preclude their repetition but never will be by ducking all responsibility with that excuse.

In addition to the two primary elements discussed at some length above, the following elements, in capsule, are suggested for consideration in any well rounded program to eliminate or combat waste in the military. Each of these elements could be particularized if desired.

1. Testimony before the authorizing and appropriations committees of the Congress by military and civilians seeking to justify programs should be under oath.
2. Budget estimates to the Congress for required programs should be submitted and justified under oath.
3. Requirements and the status of design prior to production should be submitted and justified under oath.
4. SAR and other reports to the Congress should be under oath. Today they are gimmicked or are disingenuous. (Testimony, etc. under oath does not of itself guarantee truth, but it does make people stop and think to a far greater degree than statements not under oath.)
5. Sufficient time must be allowed for the production of requirements that are reliable and maintainable. In short, the philosophy that "we do not have time to do it right the first time but we always have time to do it over" must be effectively laid to rest.
6. The Inspector Generals in the Services should be objective civilians, not military. Can one imagine a Rear Admiral I. G. having any future in the Navy if he puts Vice or full Admirals on report?
7. The Office of the Inspector General should be recognized and officially designated as the dissent channel to which "whistle blowers" have access without fear of reprisal.

8. All military and civilans above a reasonable grade (say, GS-12) should be rated annually on (i) their ability to make decisions and (ii) the accuracy of their decisions. (These are very different evaluations.)

9. All military and civilians should be rated annually—as a separate element—on their cost and waste reduction efforts.

10. The Senior Executive Service bonuses should be based in part on the element of cost and waste reduction efforts as a criterion.

11. The civilian Secretariat in DOD and the Services should from time to time make speeches on the subject of cost reduction and waste elimination. The same for top Admirals and Generals.

12. Procurement in the DOD or the Services should be controlled by the civilian Secretariat and not the military who are not educated to spend the taxpayers' defense dollars prudently.

13. The Armed Services Committees of the House and Senate and likewise the Appropriations Committees could be very helpful in this waste elimination exercise if they would conduct intelligent oversight hearings from time to time.

In conclusion, it should be obvious that existing inefficiencies and lack of proper management in defense spending will most surely multiply with the greatly increased defense billions to be appropriated and spent.

Today's waste coud seem minor to what we will all face unless strong and unpopular measures are taken now to control the increased spending spree that is coming in the very near future.

Good luck in your efforts, gentlemen.

Sincerely,

GORDON W. RULE.

ARLINGTON, VA., *November 8, 1981.*

Senator WILLIAM V. ROTH, Jr.,
Chairman, Committee on Governmental Affairs,
Washington, D.C.

DEAR SENATOR ROTH: I had the privilege of testifying before your Governmental Affairs Committee on 27 October 1981 on the subject of defense procurement/acquisition.

In reading over my transcribed testimony it is obvious to me that I could have been more responsive to your specific question regarding dual sourcing. Herewith is my elaboration.

Dual sourcing is one of those concepts that has a specious appeal to those who are not familiar with its ramifications. Generally speaking, dual sourcing is not the means of reducing unit costs by price competition that its advocates claim it is.

First off, dual sourcing is the antithesis of a basic goal of the Services, namely, standardization. Differing designs, models, parts, etc. create obvious logistic problems which negate the goal of standardization and invariably costs more money.

Thus the dual sourcing advocates must consciously make the decision to abandon standardization and face up to the basic question of purpose, i.e., what is the objective of the proposed dual sourcing and does it make dollars and sense?

If the purpose is to broaden the *production* mobilization base under the exception 16 negotiation authority, and the required justification can be made for paying the premium, which must be identified, dual sourcing has merit, but never forget that dual sourcing will cost more money.

A variation of dual sourcing has been used at the *design* stage. Assuming the funding is available—often a violent assumption—dual sources can compete in the design and pilot production phases with the ultimate decision being made on which source gets all subsequent production. The Mk 48 torpedo is the best example of this application where Westinghouse and Clevite had a design/pilot production dual with Clevite ultimately taking all production.

Dual sourcing has been used to assure faster deliveries of a product. The FFG's for example, were and are being produced by three building yards, i.e., Bath and two Todd West Coast yards. Obviously, in this case, the Navy has determined that their needs are best served by having three yards building concurrently. This is not price competition.

There are those who are currently advocating dual sourcing as a means of obtaining greater price competition and hopefully dollar savings. In my opinion, the only way in which this concept has merit is if it is recognized at the outset that such dual sourcing must ultimately end up with a sole source producer. The Mk 46 torpedo history illuminates this result. Aerojet General designed and produced this torpedo until it was decided to get a second source to reduce the cost per torpedo. A cost type contract was given to Honeywell to produce 100 such fish which they did very well indeed. Thereafter, the annual buys of the Mk 46 were split between Aerojet and Honeywell with the low bidder getting the largest quantity and the other builder being assured and awarded—subject to full audit, etc.—the lesser quantity. Honeywell consistently underbid Aerojet for the larger quantity of these annual buys and the time came to get quotes to buy out the rest of the entire program. Honeywell took the whole program and became a sole source producer.

If that is what the proponents of dual sourcing to get competition have in mind, it will work, but if it is contemplated that both sources will remain in production, then a premium will have to be paid and pure price competition will not be realized.

In conclusion, Senator Roth, dual sourcing must be considered and embraced with caution and a very clear understanding of what is the ultimate objective of the exercise. Dual sourcing, like multi-year procurement, is a "buzz-word" term today and both concepts are hazardous in the hands of non-professional procurement people who know just enough about procurement to be dangerous, as are most senior military and civilian leaders today.

Thank you again for the opportunity to exchange views with you on this important subject. I would like to iterate my conviction that when the Committees of the Congress require all Executive Department testimony on defense expenditures—estimates, pricing, etc.—to be under oath, a big step will be taken in the direction of accountability to the taxpayers.

What good reason could there be, Senator, for opposing such a requirement that costs nothing to implement? The military will oppose it in all probability, which is the best reason why it should be required.

Very respectfully,

Gordon W. Rule.

Chairman Roth. Dr. Jacques Gansler, vice president of the Analytic Services Corp. is next. We welcome you to this one-man committee. You may summarize your statement, if you so choose.

TESTIMONY OF DR. JACQUES GANSLER, VICE PRESIDENT, THE ANALYTIC SERVICES CORP., ARLINGTON, VA.

Mr. Gansler. Thank you very much.

Over the next few years, with the approval of Congress at the request of the administration, there are going to be hundreds of billions of dollars spent on increasing our defense posture. The basic question is whether or not we will get, in fact, increased goods for those dollars or whether we will just get, an inflation in defense goods. It seems to me that the answer is not at all clear and, in fact, the recent trends would certainly indicate that unless changes are made in the way we do business we will primarily get an inflation in defense goods rather than more military equipment for those increased dollars.

Current trends indicate an increase in unit costs, buying fewer and fewer planes, the absence of spare parts, the absence of readiness, the warning made by the House Armed Services Committee about the condition of the industrial base having deteriorated, and even the R. & D. process not resulting in very frequent new systems. Instead, the trends are for long, expensive and, when finally done, probably obsolete systems.

So my own conclusion is that just throwing money at the defense industry is not going to solve these problems. Instead, it is necessary to specifically address the trends in the industry; to actually make structural adjustments in the industry; to change the way defense business is done; and to do some planning, in peacetime, for possible future surges in defense production.

These changes can all be made in the private enterprise, democratic system and, in my opinion, if they are not made, we are in for some serious trouble.

Over the last few years and particularly at the end of last year, the end of 1980, there were a series of reports that came out stating the problems in the defense industry from a variety of perspectives. The thing I found interesting was that these all arrive at the same conclusions even though they came from such different places as the Congress—in the House Armed Services Committee report; the defense industry—in terms of the Defense Science Board report; the military—in terms of the Air Force Systems Command report; and independent assessments—in my own book on the defense industry.

Unfortunately, in spite of the publication of these reports at the end of 1980, many people still incorrectly assume, in my opinion, that the excess capacity in the defense industry and the unemployed labor in the country can conductively be harnessed to pour out defense items by simply turning up the defense budget.

Some of the data clearly indicate that is not the case. In fact, given today's conditions of unemployment, empty plants and equipment, it would take the aerospace industry, for example, over 3 years to respond to any demand from existing production lines, independent of source constraints. The bottlenecks have been discussed in a number of these reports. They include labor, skilled workers, and engineers, parts, and the fact that parts suppliers are disappearing from the defense industry and are discouraged from doing business in the defense sector.

The results are long lead times and raising parts costs down at the lower tiers; old production equipment, most of it over 20 years old, very inefficient and no incentive essentially for capital investments. And finally, foreign dependency, which is growing, particularly at the parts level. The cumulative effect of those conditions is that we are paying over $50 billion a year in military equipment and not getting our money's worth. Nor is the industry able to rapidly respond should emergency conditions require it.

Let me state the eight specific actions that I feel the executive and legislative branches should make. At least half of these correspond to the initiatives that Secretary Carlucci has been initiating, first is the introduction of stability into the defense planning process. I think this begins with Congress. The United States is the only nation in the world that has a 1-year defense budget; but, such actions as multiyear procurement are more likely to be achieved in the near term—they are important in achieving the stability necessary for the labor force and for capital investment.

Second, I think we should utilize realistic initial program budgets. I would say here the executive and legislative branches have been equally guilty of encouraging and allowing buy-ins, low estimates of inflation, and some of the other things you heard about this morning. It is obviously extremely difficult to use realistic numbers since it means that some programs will have to be terminated and that is a difficult decision to make.

Third, steps should be taken to introduce real competition into defense procurement. By this, I do not mean the one-time competition that simply encourages a buy-in. What I am talking about is dual sourcing of programs. I think this is probably the single largest difference between the way that the world works in the civilian sector and that which operates in the military procurement process. There are no alternatives in the military procurement process. Obviously, there is a very fierce rivalry that takes place at the beginning of a major program. Secretary Carlucci mentioned the F-15 and F-16 have been competitively procured. I will not argue that years ago they were on the R. & D. program; however, no longer can you go to anybody else for those programs. They are sole source with a single supplier and in many cases have been for over 20 years.

Thus, what I think you should do is to award contracts to two sources, let them compete annually for a share of the buy, or every 3 years if you can use multiyear procurements and do it on the basis of their performance and costs. Studies have been done in defense procurement that should show you how to save on the average of 30 percent; however, the people who have the contract always argued that that doesn't make sense because they can move down the learning curve. There is no question that this is the correct theory.

The problem is that the reality doesn't show it in defense procurement. As you show over here, costs tend to grow rather than go down. In contrast, when you have dual sources, you do have costs going down and simultaneously improved performance, which is critical.

I would caution you, however, that most of the time when people in the Government decide to have more procurements done through competition, what usually ends up happening is that the little $100,000 contracts are competed. The reason for that is someone sets up a score card and they count the number of contracts. Since we buy socks, shoes, and underwear and thousands of other things in little contracts, the Government knows how to compete these; frequently by spending over $50,000 to have a competition for $100,000 award so they can check off the score card.

I urge you if you are going to make recommendations in terms of dual competition that they be addressed to the large dollar where the impact can actually be felt in terms of defense procurement.

Fourth, I think it is essential for DOD to improve its R. & D. management. Here, I would like to see more R. & D. done down at the lower tiers, in addition to using technology to reduce the cost of systems rather than solely for performance.

Fifth, I think the DOD must begin to address directly the problems of the lower tiers of the defense industry, the supplier base. They have allowed the prime contractors to take care of that, and as a result we now have a deterioration of the lower tiers that even the prime contractors have begun to acknowledge. There are some sectors where I think the DOD has to get involved in at least assuring a viable competitive lower tier base.

Sixth, the Government should institutionalize an approach to improving the defense industry's economic efficiencies and strategic responsiveness. Here we have assumed the market will achieve the desirable characteristics for the defense industry. The problem is we have a funny market in defense here—there is one buyer and usually one supplier. Under those conditions there is not a natural market force toward economic efficiency. For example, if you think back in the 1950's, we used to build 1,000 fighter planes a year; in the 1960's, we built 3,000 fighter planes; in the 1950's, around 1,000 fighter planes a year; and now, around 300 fighter planes a year. However, we have not allowed any of the plants to close and as a result, we have all the plants operating in very much less than economic efficiency and no incentives for capital investments.

By contrast, we have some sectors of the defense industry where we had sole source suppliers for 20 years, in the case of tanks or armored personnel carriers. This problem requires a sector by sector analysis because each sector is different. In some cases we should allow them to go out of business and in other sectors we should create competition.

The Government should create incentives for contractors to make capital investments. In the case of the defense industry, they are worse than the overall U.S. economy, and that is quite poor. However, if we do create incentives for capital investments, it is essential that they be complemented by use of sufficiently high production rates.

Last, the Government must establish clear and rational international policies in the defense procurement area. Essentially they are nonexistent today.

In summary, the new administration has begun to address some of these needed actions. In fact, in his initiatives, Secretary Carlucci addresses, at least partially, five of those above eight items. Congress should enthusiastically support these initiatives and should encourage the DOD as they hopefully expand this very difficult effort into all eight areas.

If fully effective, these initiatives will result in a total cultural change in the way defense business is done. There will clearly be a need for detailed institutional changes. Followup through specific acquisition actions will be necessary, again, requiring congressional support, including the cancellation of programs and the absence of congressional add-ons.

Hearings such as this one clearly show that people are beginning to address not only the important defense question of how much we should spend for defense but are initiating dialog on the equally important question of how we spend that money.

If this direction continues and if we address questions such as are we selecting the right items and how can the military industrial-congressional complex work together to achieve efficiency in the way in which we buy equipment, then I believe the necessary changes can take place and we will have a stronger defense posture for the increased dollars being spent, essentially giving renewed meaning to the phrase, "The arsenal of democracy."

However, without such changes, we will continue to spend more and get less. The American people need and deserve, and I think will demand better use of their defense dollars.

Thank you.

Chairman ROTH. One of the claims that has been made against the use of so-called dual sourcing is the up-front costs, that it is too expensive to tool up two different contractors. Yet I think it was the Defense Science Board who noted in 1979 that we really lacked data on the total investment costs for bringing a second source into being.

Why isn't this kind of information developed? For example, take the case of the B-1. We produced, as I understand it, 4. We are talking about buying 100. Does it make sense to acquire at this stage before we try dual sourcing? I understand that the Germans, in their shipbuilding program, that once they produce a ship, they procure those ships by competition. Is there any reason we cannot do it?

Mr. GANSLER. We do it in the case of ships today. They are procured in multiple yards. The Navy used to do it prior to 1966, it was common practice to dual-source ships.

To answer your specific question about gathering of data, people have begun recently to do so. There have been studies done, in fact, all the way back to World War II. In World War II, interestingly, they found even though productivity was extremely high—with Rosie the Riveter and everybody they could get to turn out aircrafts—that the bombers built on a dual-source basis had a deeper learning curve than those built on a single-source basis.

Everybody was trying in all the plants. It was the added impetus in dual sourcing which resulted in steeper curves. There is ample data, in my opinion, and my firm has been doing a lot of activity on dual sourcing for specific programs, to show that in the majority of the cases it will pay. You have to do as suggested, a specific analysis on each case.

In some cases, it may pay to do the dual sourcing at the lower tiers. In some cases, the selection may be part of the acquisition strategy that says you have dual sourcing during full-scale development and in some cases it may be during production. In other cases you may simply look at the facilities used for that individual program.

Chairman ROTH. Do you think that kind of study has been made in the case of the B-1?

Mr. GANSLER. No.

In the case of the B-1, it is not self-evident that in fact dual sourcing may be appropriate. It may well be that alternative parts of the system should either be competed or dual sourcing should be considered. I think that the primary emphasis in the case of the B-1, from my knowledge of it, which is quite limited, would be that people have asked questions such as can it be built in the time period under consideration or is it technically feasible; as contrasted to the question, Could it be built more inexpensively, for example, through greater use of buys rather than makes by the prime contractor; through use of alternate facilities rather than bringing an old facility, in the case of Columbus, Ohio, back on stream. It was almost being closed.

Questions of the supplyside considerations for building it, I don't believe were sufficiently emphasized; as contrasted to the question, Could it be built in time or, is it possible to do so? Under those conditions, one is not stressing economic efficiency. I think that is what I would rather see.

Chairman ROTH. If I understand the thrust of your testimony, in procurement of any major weapons system, before you go into production or procurement of production, a study should be made as to what is the most effective means. We should not make any assumptions.

Mr. **Gansler**. I would say it should be done well before you are ready for production. You want to make capital investments in the plant much earlier.

If you want to have dual sourcing introduced into production, then on full-scale development, you want to bring the second producer into it so he can demonstrate he is a qualified source.

I would say you need an acquisition strategy very early in the program, rather than at the end.

Chairman **Roth**. One more question.

In your prepared testimony, you talk about the fact that the defense industry is not in such a stage that we can expand production very rapidly. I think you estimated it would take as long as 3 years to bring about the expansion that would make for increased facilities, both from the standpoint of labor, but from the standpoint of equipment and parts. You also make the statement that in defense, throwing money at the problem doesn't solve it anymore than it does in domestic programs.

Do you feel that the level of spending that is being proposed in the budget for the next 3 years is sound, or do you think we will be guilty if we approve of throwing money at a problem that won't get more weapons, but more waste?

Mr. **Gansler**. I start from the viewpoint that our defense posture has been allowed to deteriorate quite badly and we badly need to buy more military equipment, spare parts, and bullets. The whole thing has been allowed to deteriorate very badly.

I don't, frankly, believe the amount of money being considered is too much. In fact, I would raise the second question: What is it used for? If it is efficiently spent, if considerations of those bottlenecks that you talked about are introduced into the process, if we build things that we need and can get, as contrasted to just that we need, then I think the money will be wisely spent.

If we take the initiatives that Secretary Carlucci was talking about and actually do those things in our programs—for example, have efficient production rates, only go to plants that are modern and efficient, and so forth—then we will not only get our money's worth, but we will also get the necessary military equipment for those increased dollars.

I worry, however, that the debate will stop on whether we have enough money and then it will just disappear and we won't strengthen our defense posture as a result of having spent that money. Presently, it is not clear to me whether our defense posture will be strengthened. It is clear we do need to spend more money and I would like to see it spent in the right way.

Chairman **Roth**. I would gather from what you said the emphasis should be during that period of providing facilities, in large part.

Mr. **Gansler**. Worrying about the lower tiers, worrying about the parts suppliers.

We have large empty plants. We don't need more empty plants. What we need is those we need to build things in to get modern production equipment. We need people who can make forgings and castings. Skilled workers have to be targeted because there is a bottleneck there.

Raising a demand for engineers makes them go from one plant to another. It doesn't create more engineers. Computerized design and manufacturing allow those opportunities, if defense made those investments. I think we can address the bottlenecks and then have a smooth output for the dollars we spend.

Chairman ROTH. Senator Rudman?

Senator RUDMAN. Thank you, Mr. Chairman.

One question, Dr. Gansler.

In your prepared testimony you speak of the necessity for better R. & D. planning.

Secretary Carlucci spoke of that earlier. One of the things that you address, of course, in any such discussion, is the reliance on design cost rather than the other method.

What evidence do you see that that is being done on an increasing basis? Do you think it is being neglected?

That is a general question, and I will follow up with a more specific one.

Mr. GANSLER. I am afraid it has not gotten the attention that, certainly, I would like to see. There is a cultural resistance to it. In the cultural world you design for improved costs. In the military world, we design for improved performance, and then see how much it costs.

It took over 3 years to even implement into the defense armed services procurement regulations, just the statement that design-to-cost is a good idea.

Prior to that, it was not an accepted, allowable practice.

We are getting very high quality, but not enough of them.

Senator RUDMAN. Isn't it also an answer to the other problem that has been identified historically in a number of recent systems as being one of the major factors for cost overruns, namely, the desire of the people in the military to go over that last increment of specification, be it in an Air Force fighter, a Navy submarine, a radar system for advanced technology fighter aircraft that we have; isn't it a fact design to cost is a way to institutionalize that from happening?

Mr. GANSLER. Yes, it is. I think it should be done. It does require some degree of flexibility in the contract process.

In other words, you have a so-called firm specification for performance and you are also trying to design it to be a certain unit production cost.

You have to be able to make trades between cost and performance. As we do now, we hold rigidly to the performance specifications and double the cost.

Senator RUDMAN. I think one of the more interesting programs we ought to look at in terms of design to cost is the Air Force's recent proposal for a new transport and all of the attendant questions that that raises in terms of available equipment.

Senator Cohen spoke about that this morning. Would that not be an area in which design to cost ideally ought to be applied, this is a transport aircraft in which there is an enormous historic data bank available in this country. We make transports.

We are the world's largest producer of transports, be they military or civilian.

Mr. **Gansler**. Design to cost has been tried very successfully on defense programs. It is not that it is an unknown. It has been done and when done it is extremely successful. The result is higher reliability for the system and lower costs. Clearly those programs which don't push this edge of the state of the art of high technology are the ones which will be more applicable.

Senator **Rudman**. Do you happen to know of, offhand, or could you supply for the committee some of these programs in the last several years, or last 5 years, that have used essentially a design-to-cost approach and what you thought that proved in that particular program?

Mr. **Gansler**. I can give you an example. The Air Force had a TACAN system, radio navigation system, where the existing one cost something on the order of $35,000 and it had a reliability, depending on whether you believed the contractor or Government of between 35 and 350 hours. It was costing more annually to maintain that system than to buy a new one. The Air Force properly said, "We are going to introduce new technology, we want a lower cost and a higher reliability system."

So they said, "We want a new system that is going to cost $10,000 and will have a 1,000-hour reliability in the field and should be a good performing system."

When that system was deployed, in production, it actually, including the impact of inflation, came in under $10,000 and had a reliability over 1,000 hours.

It was an extremely successful program. There have been a very selected number, though. They are usually treated as experiments. When the experience is over, we go back to doing business the way we did before.

Senator **Rudman**. I will yield to Senator Pryor.

Senator **Pryor**. I would like to compliment you on your book. I agree with you on almost all your conclusions. I certainly commend it to our colleagues for their reading.

Mr. Carlucci stated earlier today, Dr. Gansler, that about 69 percent of DOD's procurement funds are awarded as a result of competition.

This doesn't somehow agree with GAO. I am not certain it agrees with your findings on competition in defense dollars. I wonder if you would make a comment on that, if you could.

Mr. **Gansler**. I didn't hear Secretary Carlucci's statement. I do know there is frequently a difference in numbers quoted between the percent of the contracts and the percent of the funds and one has to be quite careful about that distinction because we buy tens of thousands of items all the time.

So there are large numbers of contracts as compare to very large numbers of dollars.

I don't believe, in terms of competitive procurement data, that the percent of the funds is as high as you mentioned. There is another thing which is often done on the scorecards which is to count all follow-on programs as part of those which were awarded competitively.

I have a problem, frankly, with that way of keeping score, because you end up with a situation such as an airplane that you are now buying after 10 years, having followed after 10 years of development, all of that having been done under sole source and saying that is a competitive program.

How can it be a competitive program, when there is no one else you can go to for that particular piece of equipment.

Senator PRYOR. I assume the follow-on process in most instances is more than the original price of the contract.

Mr. GANSLER. In most major weapons systems the original contract is awarded as a development contract.

The largest dollars by far in the program are in the production and they seem to be awarded as follow-on.

Senator PRYOR. Here is a simple question I have wondered about.

Do you know of any defense contractors who have lost any money on defense contracts in the last several years?

Mr. GANSLER. Oh, yes.

Senator PRYOR. Or is there a way for a defense contractor to lose?

Mr. GANSLER. Very frequently they do. It is done because in the beginning of the program you are almost required to buy in. So you start off in a loss situation. If for some reason your program does not grow sufficiently, you end up in a very serious financial situation. There have been a lot of defense contractors in that situation. Most of the shipbuilders have the Government in court over just that issue.

The actual profit for the shipbuilders because of their own capital investment has been extremely low, much less than they would be getting if they just put their money in the bank.

In that sense, it is not a particularly profitable business. The place we most frequently see the people going out of business, Senator, is at the lower tiers because the Government does not come in and bail them out as contrasted to the prime contractors.

Senator PRYOR. That brings me to my next question and that is, What specific planning has the Department of Defense done to end the erosion of the industrial base at the subcontractor, parts, and supply level? Do you see anything the Department of Defense is doing to stop that erosion?

Mr. GANSLER. In Secretary Carlucci's initiatives, there are no explicit statements that are addressed to the lower tiers, but it is understood that they should be. Also, I understand it was the intent of the Congress in some of the initiatives, such as multiyear procurement. It remains to be seen if that is actually the way in which they will be implemented.

The attention to the lower tiers is not now an explicit or institutional approach. It is, one hopes, going to be there.

Senator PRYOR. Also, there have been questions for me and many of my colleagues relative to the M-1 tank. We have talked a great deal today about the B-1 bomber and M-1 tank, and I think they typify some of the decisionmaking process we want to look into more closely in the Defense Department. Wouldn't the M-1 tank be a prime weapon for dual sourcing?

Mr. GANSLER. I would like to see it considered for that.

Senator PRYOR. Why do we only have one tank builder?

Mr. **Gansler**. As I said, I would like to see dual sources considered as a possibility. It seems to me we do have two tank plants; but no competition. The Government has put up most of the capital equipment and, therefore, there should be lots of contractors who would be very enthusiastic to run plants with a very high return on investment; since their investment is almost zero. I think you are arguing the case between those who say that by having one supplier there are economies of scale and you go down a learning curve, therefore, the cost of the tank should get less, and that is the theory, against those who say, but the theory doesn't apply when you only have one supplier.

He has incentives to raise his price and the empirical data all show that when you have dual sources you, in fact, lower the costs.

In fact, the data shows you get both a shift and rotation in the learning curve and the result is improvement of the cost of the equipment. I would think having had the same supplier of tanks for the last 20 years would not be a great incentive to lower costs.

I would like to see this as an area that one looks into for dual sourcing.

Senator **Pryor**. We will shift once again back to the B-1. Do you feel that the B-1-Stealth decision, and it looks like that decision has already been made, do you think we are building one obsolete plane knowing it is going to be obsolete when and if it is built, to be replaced by the second plane, the Stealth?

Mr. **Gansler**. From a pure acquisition strategy perspective, let me comment.

I think there is some very good thought given to the idea of attempting to make the B-1 and the Stealth competitive. It seems to me that is the only competition to the B-1. It probably would be impractical to set up a second source for the B-1 in the time period required and the quantities are so small that it probably would not make sense.

If the Stealth comes along, as hoped, earlier and having advance technology, then it is very likely the total quantities of B-1's to be built would be less and the B-1 could be viewed as sort of a gap filler, if you will, for that special time period problem.

I would hope that is what happens with the B-1, that the Stealth is efficiently and effectively procured so it represents viable competition to the B-1. I would like to see as much competition in the Stealth program as possible to keep it at a lower cost and, therefore, come in as early as possible and hopefully at a low cost and represent a viable competitor to the B-1, to replace the tail end of the B-1 production.

Senator **Pryor**. Let me just ask one general question, if I might, in conclusion, Dr. Gansler.

I am worried about an admonition that was given to us a couple of decades ago by President Eisenhower when he warned us of the military-industrial complex. I saw some overtones of this throughout your book. Is the military-industrial complex alive and well today, and are the pressures developed by that complex such that it is that relationship working in combination that really is calling the shots for long-range procurement in weapon decisions?

Mr. **Gansler**. The implication of the term "military-industrial complex" is that we have an efficient operation between the military and the industry to achieve what they would like to have mutually. I don't believe this is the case today since I don't believe we are getting the amount of equipment, or the reliability of equipment, or cost of equipment that we would like to have. Therefore, I can only conclude that we have a military-industrial complex that is not working. I would have to say that part of the reason is the fact that there is an adversary relationship, which has been discussed by Secretary Carlucci a number of times.

Part of the problem is we don't take a supply side perspective in the United States; we don't consider the industrial base supporting, in this case, the defense industry. We do extensive planning on the budget cycle and on the forestructure but we do not, in any way, consider the industrial base in terms of making it viable, competitive, efficient.

The suggestion you made about considering two sources, that is not normally done. It is assumed that the market will take care of that, however, there is no market. So, we don't consider what I would call the second best solution; namely, create a market, have two suppliers, or where we have too many suppliers, the Congress won't let any of the plants close down and, therefore, a viable market is not created.

We keep excessive suppliers. We could have a competitive market with three or four. Instead, in some areas we have 16.

Senator **Pryor**. The buzz phrase is "window of vulnerability." That is a classic Washington phrase. My question is, can we purchase invulnerability? Is there any way we can spend enough——

Mr. **Gansler**. Not in that sense.

Senator **Pryor** [continuing]. To purchase a position——

Mr. **Gansler**. What we can clearly do is strengthen our defense posture considerably. It is very weak now in my opinion. It is not able to essentially maintain any form of sustained conflict. It is not in a situation with the flexibility to take a variety of conflicts. It isn't able to respond, in my opinion, or to represent in some cases a credible deterrent. This strengthened posture can be purchased with increased expenditures on the right things, and done in the right way. That is what I would like to see us do.

Senator **Pryor**. Thank you, Dr. Gansler.

Chairman **Roth**. Thank you, Senator Pryor.

And thank you, Dr. Gansler.

I understand from your testimony that your firm is doing some work on second sourcing. We would be very much interested in having the opportunity to see the results of those studies that were practical.

Mr. **Gansler**. There is a summary report which is not program-specific that I can send to you, Senator.

Chairman **Roth**. Thank you.

[Dr. Gansler's prepared statement, responses to written questions submitted by Senator Roth, and the summary report referred to follow:]

PREPARED STATEMENT OF DR. JACQUES S. GANSLER

At the request of the new administration, and with the approval of the Congress, hundreds of billions of dollars more will be spent—over the next few years—on badly-needed military equipment. But, only with changes in defense acquisition practices will taxpayers get their money's worth, and our national security posture be strengthened. Without such changes, the recent trends—in diminishing economic efficiency and declining strategic responsiveness of the defense industrial base—indicate that these increased dollars will mostly result in a rise in the price of military goods; rather than in the additional quantities of required equipment.

Consider the trends over the past five years:

1. Each year, we produce fewer units of military equipment—fewer planes, fewer ships, fewer guns—while spending more and more real dollars for them.

2. We don't have the military forces in being, the trained personnel, the spare parts, or the war reserve materiel needed to sustain an extended military conflict.

3. The House Armed Services Committee recently declared, "The general condition of the defense industrial base has deteriorated and is in danger of further deterioration." Yet, there has been no planning or expenditure of resources to promote rapid industrial responsiveness to increased production demands. Production surge and mobilization potential are important parts of an industrial nation's deterrent posture, however, today—even with unconstrained expenditures—it would take years before significant production increases could be realized from the defense industry.

4. The R&D area is also faced with serious problems. More and more R&D dollars are going to fewer and fewer large, expensive long-duration development programs. This cuts down options and greatly reduces the chances for technological innovations; especially those coming from the small, inventor-led companies.

Just throwing money at the defense industry will not solve the current problems. Rather, it is imperative to address the bottlenecks and trends directly; to make significant structural adjustments in the industry; to change the way defense business is done; and to plan (in peacetime) for potential surges in production of selected military equipment should future needs arise. These changes can be made within the desired free enterprise, private ownership, democratic system; and must be made if we are to get the necessary military equipment for the increased budget dollars—rather than continue to simply feed the inflationary spiral.

These problems are not new. The Joint Committee on Defense Production raised these issues in a series of hearings and studies conducted over five years ago. The 1976 Defense Science Board Summer Study report, and my own paper in the Harvard Business Review of May–June 1977, entitled "Let's Change the Way the Pentagon Does Business," also highlighted some of these problems. Yet, only very recently has the seriousness of these problems been widely recognized and accepted. Specifically, four reports on the subject—from a wide diversity of backgrounds—appeared at the end of 1980, namely:

House Armed Services Committee, Industrial Base Panel Report, "The Ailing Defense Industrial Base: Unready for Crisis," December 31, 1980. (Chairman, The Honorable Richard Ichord.)

Defense Science Board Task Force Report on Industrial Responsiveness, November 21, 1980. (Chairman, Robert Fuhrman.)

The Air Force Systems Command statement on defense industrial base issues, November 13, 1980. (General Alton Slay.)

"The Defense Industry," J. S. Gansler, MIT Press, October 1980.

Unfortunately—in spite of the publication of these four reports—many people still assume, incorrectly, that the excess capacity in the defense industry and the unemployed labor in the country can be productively harnessed to pour out defense items merely by increasing the defense budget. In fact, the opposite appears to be the case. Even under today's conditions of unemployment and available plants and equipment, the aerospace industry, for example, would require over three years to increase production significantly, from existing lines. To better understand this dilemma, consider the bottlenecks:

Labor.—Currently, despite high unemployment in other fields, there is a significant shortage of defense-related engineers and skilled laborers, which is expected to get worse as the aging defense production work force retires. Money alone won't create these people, only long-term training will. These are not the workers who are unemployed today, and the United States has no program to address this critical problem.

Parts.—There are fewer and fewer defense parts suppliers. Low profit, one-year orders, cyclical demand, special military requirements, excessive regulations and paperwork, and similar factors make defense business far less attractive than comparable civilian business for the parts supplier. The result has been far fewer lower-tier sources; rapidly rising prices, and extremely long lead times on deliveries from the few remaining, highly-specialized defense suppliers (at the lower-tier levels)—many of whom are the sole source for a critical item.

Production equipment.—Most of the available defense production equipment is well over 20 years old, and is very inefficient. Few skilled workers are trained to operate such equipment. Those few, modern, efficient production units that exist—such as the large forges and the big, multi-axis, numerically-controlled airframe assembly machines—are already in use on three shifts; leaving no capacity for expanded production. Overall, there has been relatively little capital equipment bought in the defense industry in recent years, and there are almost no incentives to do so in the future.

Foreign dependency.—In addition to the known, critical nature of our dependency on foreign raw materials and energy, there is a growing list of foreign sole-source suppliers of critical military parts and subsystems.

The cumulative effect of these conditions is that the United States is paying over $50 billion a year for military equipment, and not getting its money's worth. Nor can the industry supplying this equipment expand rapidly enough to make a difference in the outcome of any likely-duration conflict.

Let me recommend eight specific actions that should be taken by the Executive and Legislative branches in order to improve the situation significantly over the coming years:

1. *Introduce stability into the defense planning and budgeting process.*—The United States is the only nation in the modern world that does not have a multi-year defense budget approved by its legislative branch. Thus the problem of achieving stability begins with the Congress. However, although there are Constitutional and political factors which discouraged across-the-board multi-year authorizations or appropriations, there are actions—perhaps more readily attainable—which can go a long way toward creating greater stability within the defense acquisition process. These include multi-year procurements and adhering to planned quantities and production rates (without either the "stretch-outs" introduced by the DOD in the budget process, or the revisions introduced by the Congress). Such improved stability will directly address the ability of the industry to maintain a relatively stable workforce, and to plan its capital investments appropriately.

2. *Utilize realistic initial program budgets.*—Both the Executive and Legislative branches have been guilty of allowing—and even encouraging—initial "buy-ins" on programs. That is, permitting unrealistically low initial estimates for programs so that they can get through the approval process; even though everyone—from the industry to the DOD and Congress—is aware that the numbers are overly optimistic. Frequently, realistic cost estimates—conducted by independent sources, or based on previous experiences—are ignored. The problem is compounded by applying unrealistically low inflation indices to the program. As a result, when costs begin to grow, other programs are cut back, or the specific program is stretched out; causing further cost increases across the board and creating further cutbacks, and on and on. The solution would be to use realistic numbers in the first place; but that is extremely difficult because many other programs either could not be initiated or would have to be terminated (both difficult actions). Naturally, everyone would agree that we need realistic cost estimates. The question is: How to break the present vicious circle and begin to accomplish this? The next few recommendations address this point.

3. *Steps should be taken to introduce real competition into defense procurements.*—This does not mean more of the sort of "one-time" competition presently used. It means dual sourcing throughout the program. Perhaps the single most important difference between defense business and civilian business stems from the all-too-frequent absence of alternatives in the military procurement process.

In defense, there customarily is a fierce rivalry during the initial competition for an award of a research and development contract. After this initial competition—frequently awarded based upon a firm's "buy-in"—the winner becomes the sole developer and producer for the military system over the next 20 years. Thus, a program—such as a missile system—may once have had an initial competition, but after that first step there is no alternative source for this much-needed piece of equipment. Therefore, the sole-source producer increases the price, the government has little choice but to attempt to "negotiate," and basically to accept the cost increases.

By contrast, in the civilian sector the buyer would usually refuse to accept such increases, and would go to alternative producers. Occasionally, a similar approach has been tried in defense procurements. Almost always this yielded very significant savings to the government. (Studies by TASC have found typical cost savings of 30 percent upon introduction of production dual-sourcing.) Of course, the initial producer always argues that by building more units himself he will move down the "learning curve" and therefore it would not be worth the government's money to pay for the initial start-up costs of a second source. In theory this is true; but in practice prices have almost always been found to rise in defense procurements, as a result of the sole-source conditions of the producer. Therefore, I favor far more dual-sourcing of defense production; wherein the annual buys are split between the two producers as a function of the quality and cost of their equipment in the prior years.

At this point, let me make a brief aside relative to the subject of competition in defense procurements. Traditionally, whenever there has been a suggestion for more competition in defense procurements, this has usually resulted not in the awarding of two contracts for production of defense equipment (the form of real competition in the civilian world), but rather in the establishment of a "box score" for the number of contracts that Defense awards through competitive procurements. As a result, the small contracts (e.g., $100,000 scientific, engineering, and management analyses) are made on the basis of auctions for the lowest bidder. This has a variety of negative impacts. First, it frequently costs the government and industry well over $50,000 to hold each of these competitions—which far exceeds any possible cost savings. Second, as a result of funding not the best study, but the cheapest one (and often based on a "buy-in") potential overall DOD savings of hundreds of millions, or billions, of dollars that could be realized as a result of a good, independent analysis, are simply not explored. In fact, recent legislation—such as that of Congresswoman Ferraro and Senator Pryor—has gone to such an extreme in attacking the broad studies and analysis work—of all types (including detailed engineering analyses)—done in attempting to support defense decisions, that they are proposing to outlaw all "unsolicited proposals." This means that small research firms will be discouraged from submitting new ideas. Instead, the assumption is that good ideas are only generated by the government. Each idea will then be put out for competitive bids; and the large firms will always win them (through cross-subsidization, i.e., defacto buy-ins). Obviously, my hope is that if this Committee comes out with any revised legislation in the area of increased competition for defense procurements, consideration will be given to the difference between small-dollar-value contracts (for example, under $1 million)—which should be awarded on the basis of demonstrated quality work and/or unsolicited, new ideas (e.g., studies and analyses)—and large-dollar-value defense production programs which should be awarded on the basis of a combination of low price and high quality—and preferably awarded to multiple sources.

4. *DOD must improve R&D planning* to allow for greater quantities of equipment and more technology advancement. Dollars should be shifted in the direction of "new idea generation" rather than simply paying for long, large, and expensive full-scale development programs. Often, modifications of existing systems is cheaper and faster—with much less risk, yet comparable mission performance. Similarly, more R&D dollars must be shifted to the lower tiers of the defense industry and to the small firms (where historically many of the very creative new ideas have originated). Finally, there must be far greater emphasis on design-to-cost; wherein the performance of systems is traded off against the unit cost of those systems, and engineers are trained to design equipment at an affordable cost. This will allow new technology to be used in cost reduction (as well as performance improvement)—as is done in the civilian world; and will thereby allow the U.S. to acquire the needed quantities of military equipment. Otherwise, the U.S. will be driven into a position of having only a very few, very high performance systems which would be insufficient to win a war.

This clearly leads into the "quantity/quality" debate presently being raised by Senator Hart and others. It is highly appropriate that these related issues: roles, missions, weapon vs. force performance, wartime expediency and utility, the "inherent" cost of maximum-possible performance, and producability, should be raised. However, regardless of the types of weapon systems in the force structure—whether they are relatively more or relatively less sophisticated—separate consideration must be given to acquisition efficiency.

5. *The DOD must begin to address directly the problems at the lower tiers of the defense industry,* both in terms of their own policies, and the way subcontractors are treated by primes. Most of the lead time, single-source and similar problems which limit defense capacity are at the lower tiers. This—a key finding of the Defense Science Board—was confirmed by several recent TASC studies of lead times and industrial responsiveness. Specifically, DOD must emphasize efforts to establish multiple sources for critical items. More research and development funding should be channeled to these firms. More "combined buying" (to increase volume of the buys) must be done. Paperwork requirements on smaller firms should be reduced significantly. Smaller firms simply do not have the high-priced law firms, accounting and administrative staffs to comply with detailed requirements. The lack of overhead is one of

the principal reasons they are more efficient and DOD should take advantage of this efficiency.

With regard to their treatment by primes, there must be more "flowdown" of the beneficial contract provisions given to the prime contractors—progress payments, special inflation clauses, etc. Finally, and most important, there must be greater stability and a reasonable profit (consistent with the risks) provided to these lower-tier defense suppliers.

6. *The government should institutionalize an approach to improving the defense industry's economic efficiency and strategic responsiveness.*—To date, it has been assumed that "the market" will achieve desirable characteristics for the defense industry. However, due to the unique characteristics of this market, i.e., one buyer and usually one, or very few, suppliers, this has not been the case. Under the condition of a monopsony and oligopoly market, the government must determine the influence of its actions on the structure, conduct, and performance of the industry. For example, in the 1950s the United States bought over 3,000 fighter planes per year. In the 1960s this went down to 1,000 planes per year, and in the 1970s down to 300 planes per year. Yet the structure of the aircraft industry remained largely the same, with essentially the same number of plants. This has aggravated the cost and schedule problems I mentioned earlier, because it has been necessary to reduce quantities and "slip" schedules in order to keep each aircraft producer alive, even at a low level.

As I noted before, the existence of these empty, or underutilized, plants does not assure either efficiency or responsiveness. Thus, in this case, the government should allow the competitive market to operate, and allow a reduction in the number of plants. By contrast, however, in the tracked-vehicle industry there has been only one producer of tanks, and one producer of armed personnel carriers for many years. Therefore, it may be in the government's interest to create a viable competitive market by requiring a second source in each case. As would be expected, corrective actions are different for different sectors, since building ships is not the same as manufacturing bullets, or building radars. Thus, sector by sector analyses are required, and actions must be taken to maximize the efficiency and responsiveness of each individual sector of the defense industry. These actions must consider both the peacetime efficiency and the wartime surge capability of the individual sector. Some of them may result in a common improvement in both efficiency and responsiveness. For example, the ordering of long-lead parts a few years in advance would raise the volume at the parts industry level and thus lower their price, while simultaneously improving the overall responsiveness of the defense industry. Similarly, far greater integration—at the plant level—between military and civilian production of equipment should result in higher volume in those plants and thus greater overhead absorption and lower costs; while at the same time resulting in greater production surge capability—through the ability to shift civilian workers, production equipment and parts into the military area, when a surge is required. The same works in reverse if cutbacks are required on individual defense programs—you don't have to close the plant if a program is cancelled.

Clearly, such analyses and actions to improve industrial efficiency and responsiveness will require some resources, but the long-range payoff in terms of peacetime production of military equipment, as well as crisis response from the defense industry, will more than warrant the small, front-end investment.

7. *The government must create incentives for contractors to make capital investments.*—To improve productivity in defense—as well as in the rest of the nation's economy—changes in taxes, cost accounting standards, procurement and profit policy, and other areas of legislation are required in order to encourage industry to make the capital investment needed to achieve lower equipment costs. This, however, becomes a self-defeating action unless efficient production rates are used in those modernized plants.

8. *Finally, the government must establish clear and rational international policies in this area.*—These range from our policies on foreign military sales through our growing dependency on the importing of raw materials, critical parts and subsystems, to technology transfer, interoperability of logistics systems with our allies, and many other complex issues. My personal preference would be not to establish trade barriers; but rather to take advantage of America's areas of strength. For example, in areas in which we are currently dependent for critical parts on a foreign supplier, initiate a next-generation research and development program in that area—so that we could become the exporters for the next generation of those parts.

The new administration has begun to address some of these needed actions. In fact, in his recent initiatives Secretary Carlucci explicitly addresses—at least partially—five of the above eight items. (Specifically, items No. 1, No. 2, No. 3, No. 6, and No. 7.) Congress should enthusiastically support these new initiatives, and encourage the DOD as they (hopefully) expand this very difficult effort into all eight areas.

If fully effective, these initiatives will result in a total "cultural change", in the way in which defense business is done. Thus, there will be a need for detailed institutional changes, as well as continuous follow-up for implementation; both through policy actions and, most importantly, through individual program acquisition decisions—again, requiring Congressional support.

Hearings such as this one clearly show that people are beginning to address not only the important defense question of "How much should we spend?" but are initiating dialogue on the equally important question of how we spend that money. If this direction continues, and if we address such questions as, "Are we selecting the right items?" and "How does the military-industrial-Congressional comples work together to achieve efficiency in the way in which we buy equipment?" then I believe the necessary changes can take place and we will, in fact, have a stronger defense posture for the increased dollars being spent—giving renewed meaning to the phrase "arsenal of democracy."

However, without such changes, we will continue to spend more and get less. The American people need, and deserve, and will demand a better use of their defense dollars.

Responses To Written Questions Submitted by Senator Roth

Question 1. Many believe that one of the major reasons DOD does not use competitive contracting methods more often is due to the fact that it is easier to use sole-source or negotiated contracts. The Defense Science Board found in a 1979 report that: "Army and Navy felt there was a substantial increase in effort required to establish competition. They expressed concern regarding personnel resources if competition was too widely applied. Both the Army and Navy indicated . . . that cost should not be an overruling factor" (in a contract).

There is more effort required to compete a contract. But isn't it worth the extra effort? And isn't cost already a secondary factor in the minds of contracting officers?

Answer. Yes, there is more effort required to compete a contract, but the competitive process—if properly implemented—would yield fruitful results. It could result in less overall effort on the part of the government through allowing competition to do most of the regulating and monitoring, rather than detailed government involvement. However (as noted in my testimony) there are two blatant abuses of the competitive process which must be eliminated. The first is the use of competition for an award rather than during an award. The idea of having a one-time competition for a program simply encourages "buy-in", as contrasted to the desirability of having dual sources for large DOD programs. The latter clearly is in the direction of driving prices down throughout the life of the program, and is the direction that DOD competition should move.

The second abuse of competition in the contracting process is applying it to very small contracts, when the cost and effort for competition far overwhelms the benefits. Delay of an important study for the DOD in order to compete it means that not only will it be done nine months later, but that the cost of the competition (for example, about $50,000) will certainly not be worth the benefits on a $100,000 study. Thus, the focus of competition in DOD procurements should be on the large awards rather than simply in terms of the numbers of contracts awarded in the competitive manner. (The DOD does most of its contracting in terms of numbers on small awards, and already has extensive competition for most of these.)

Question 2. Multi-year funding for major weapons programs is now being promoted as one of the best ways to save money in DOD acquisitions. Yet, some studies suggest more money is saved in multi-year procurements due to the fact they were competitively bid rather than the fact that they were multi-year contracts. Doesn't it make sense to restrict multi-year contracts to those that are going to be competed?

Answer. No. Multi-year contracts should be used whether they are competitively awarded or done on sole-source programs. The benefits of multi-year contracting, that is, greater stability, higher volume, incentives for capital investment, etc., all apply whether or not the award was made competitively.

Question 3. Why doesn't the Defense Department like to use the competition process for letting contracts?

Answer. The Defense Department acutally uses the competitive process for most contracts—it just doesn't tend to use them for the very large contracts, and thus doesn't affect the majority of the program dollars. The reason is that there is a "tradition" of having competition for an initial award, and then having sole-source producers thereafter. Thus the way to break down this history is to do far more dual-sourcing. As noted above, this is the preferred form of competition in DOD contracting, and much more consistent with that which is done in the commercial world.

Question. 4. In the private sector, new technology is used to improve a product and lower its cost but in DOD new technology only raises the cost of a weapon while often making it less reliable. Why does this happen in your view?

Answer. The DOD does not use technology to reduce costs or improve reliability, because it mostly designs systems for maximum performance (almost regardless of the cost). To reverse this trend, the DOD would have to shift towards the commercial practice of "design-to-cost". While this practice is now a part of the DOD regulations, it is hardly ever used—and then only as a secondary consideration. The reason that the commercial world uses technology for both performance improvement and cost reductions is that it doesn't try to get the maximum possible performance from the new technology, but rather is willing to achieve the optimum balance between high performance and lower cost that is potentially possible from new technology. Naturally, the result of this lower cost is to simultaneously allow higher volume, thus further reducing the cost. (Again, this is an advantage the DOD does not pursue, for example, increase quantities when the costs go down.)

Question. 5. Do you believe the Defense budget for fiscal year 1982 complements the Carlucci initiatives? For example, program stability was one of the touted purposes of the initiative and yet we now have a new B-1 Bomber, the MX missile, the "Stealth" bomber, a new D-5 missile for the Trident 2 submarines and research on a massive new communications system which is designed to operate during nuclear war all added on top of existing weapons programs which are already straining the Pentagon budget and causing instability in existing weapons programs. Isn't this inconsistent with the Carlucci initiatives?

Answer. The fact that a number of new programs are being initiated does not necessarily mean that there is inconsistency with the Carlucci initiatives. Rather, the important question is whether or not there is an acquisition strategy on these new programs that is consistent with the Carlucci initiatives. Similarly, it is essential that these initiatives be applied to the existing programs. One must look at each program to determine whether or not it is consistently applying the initiatives, for example, efficient production rates, multi-year contracting, dual-sourcing, preplanned product improvements, etc.

EM-171-WA

AN ANALYSIS OF THE IMPACT OF DUAL SOURCING OF DEFENSE PROCUREMENTS

7 August 1981

TASC

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FOREWORD

This paper summarizes the results of research and analysis undertaken by The Analytic Sciences Corporation (TASC) on the cost impact of competition for production of weapon systems. To this end, TASC's analytic framework for predicting the potential savings due to competition is presented. The theoretical basis and empirical foundation of this framework are described in detail.

1. INTRODUCTION

The use of competition, as a means of reducing the costs associated with the acquisition of weapon systems, has received increasing attention within the Department of Defense. The Analytic Sciences Corporation (TASC) has developed an analytic framework for predicting the costs and benefits of a competitive production approach. The evolution and the unique characteristics of the TASC approach are described.

1.1 PRIOR STUDIES

Numerous studies have attempted to estimate the impact of competition on weapon system acquisition costs. The key results of some of these prior studies are presented in Table 1.1-1.

These studies have clearly demonstrated cost savings can result from competitive procurement. However, the results of the studies are highly aggregated and show a large range of estimates of average net savings varying from over fifty percent to twelve percent. Identification of the causes of this wide dispersion in results is a key step in rigorously quantifying the impact of competition on production costs for individual programs.

TABLE 1.1-1

SELECTED RESULTS OF PRIOR STUDIES

Sponsor	Year	Number of Systems	Average Savings (%)
IDA	1979	31	31
APRO	1978	11	12
ARINC	1976	13	47
IDA	1974	20	37
LMI	1974	1	22
LMI	1973	NA	15-50
JNT ECON COMM	1973	20	52
ECOM	1972	17	50
BMI	1969	20	32
RAND	1968	NA	25
McNAMARA	1965	NA	25

1.2 TASC'S PRIOR ANALYSIS

In 1979, TASC, under contract to the Joint Cruise Missiles Project Office, undertook research and analysis to quantify the potential savings due to competition during the production phase of the Air Launched Cruise Missile. The prior studies listed in Table 1.1-1 were reviewed. The dispersion in the results of those studies was found to be a function of:

- Study assumptions
- Computational methods
- Analytic approaches.

Based on this research, TASC developed a common framework for assessing the impact of competition on recurring production costs. TASC reviewed 45 individual competitive programs using the common framework. The results of this review, are displayed in Table 1.2-1. The average savings for the 45 individual programs is approximately 33 percent. This is within the range of the prior studies and demonstrates that there are potential cost benefits associated with competition. Of greater importance is the wide range of estimated savings arrived at using a common analytic framework. The estimates show that savings due to competition are unique for each particular program. The review clearly suggests that program specific charactertistics play a significant role in determining the magnitude of the potential benefits of competition.

Based upon this finding, TASC embarked upon the development of a predictive framework that could be used to assess the cost and benefits of dual source production for future production programs. The original work concentrated on the impact of competition as demonstrated by learning curves. TASC's continuing work has resulted in the development and refinement of the TASC Cost Improvement and Production Curve (CIPC) Model.

The TASC CIPC Model is a unified methodology integrating cost improvement curve effects, production rate variations, and the impact of competition on the recurring costs associated with the production of weapon systems and subsystems. The basic formulation considers unit production cost as a function of both total quantity produced and the production rate in effect at the time.

The CIPC Model is an integral part of TASC's overall approach to analyzing alternative acquisition strategies. TASC's approach, the Production Cost Analysis Methodology (PCAM), integrates the CIPC model with management and data analyses.

TABLE 1.2-1

PRODUCTION COST SAVINGS FROM COMPETING
PREVIOUSLY SOLE SOURCE CONTRACTS*

Programs	(%)	Programs	(%)
AN/APM-123	67.7	USM-181 Telephone Test Set	36.3
MK-980/PPS-5	66.5	Standard Missile, ER RIM 67A	34.0
AN/ARC-54	63.1	AN/SGS 23 208A Transducer	32.3
MK-48 Torpedo - Test Set	61.8	Tow Launcher	30.2
MK-48 Torpedo - Exploder	61.2	TD-660 Multiplexer	28.4
AN/GRC-103	60.1	BULLPUP 12B Missile	26.5
Standard Missle, MR RIM 66A	59.2	APX72 Airborne Transponder	23.3
AN/ARA-63 Radio Receiver	57.9	FAAR TADDS	18.2
TD-352 Multiplexer	55.6	FAAR Radar	16.6
AN/PRC-25	55.0	Dragon Tracker	12.3
60-6402 Electric Control	52.7	TOW Missile	12.3
MD-522 Modulator-Demodulator	51.9	UPM-98 Test Set	11.5
Hawk Motor Metal Parts	49.9	AN/ASN-43	10.7
MK-48 Torpedo - Warhead	48.6	SPA-25 Radar Indicator	10.7
MK-48 Torpedo - Electric Assembly	47.0	SHILLELAGH	9.4
CV-1548 Signal Converter	45.4	Dragon Round	2.8
AN/FYC-8X	43.2	Sidewinder AIM-9D/G	.7
TD-204 Cable Combiner	42.0	PP-4763/GRC Power Assembly	.5
AN/PRC-77 Radio	41.9	SPA-66 Radar Indicator	-3.4
AN/GRC-106	41.8	Rockeye Bomb	-4.5
TD-202 Radio Combiner	40.2	Sidewinder AIM-9B	-5.6
FGC-20 Teletype Set	39.9	AN/ARC-131 Radio	-16.1
TALOS Missile	39.8		

* AVERAGE PRODUCTION COST SAVINGS FOR 45 PROGRAMS: 33%

2. COST IMPROVEMENT CURVES AND THE IMPACT OF COMPETITION

2.1 COST IMPROVEMENT CURVE

A cost improvement curve reflects the relationship between the unit cost (or unit price) of an item and the quantity of the item produced. An "80 percent" curve is one in which a doubling of output drives unit cost down to 80 percent of its initial value. That is, the cost of the 2Nth unit is 20 percent less than the cost of the Nth unit. Graphically displayed in Figure 2.1-1 is a cost improvement curve in standard form.

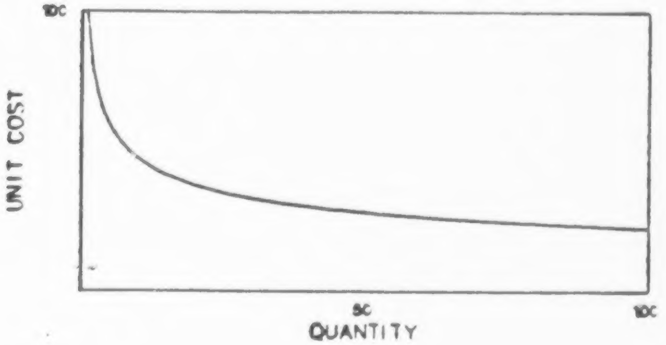

Figure 2.1-1 Cost Improvement Curve in Standard Form

Frequently, cost improvement curves are depicted in logarithmic form (the logarithm of unit cost as a function of the logarithm of cumulative quantity) producing the linear relationship display in Figure 2.1-2.

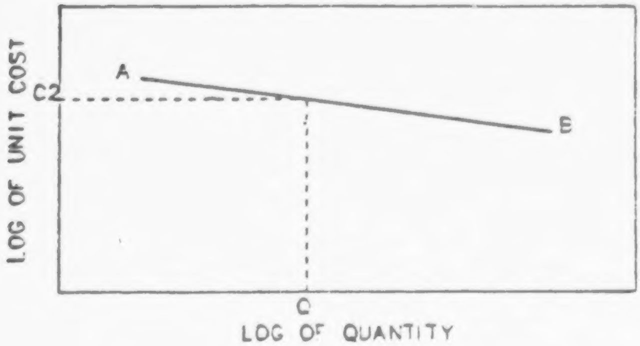

Figure 2.1-2 Cost Improvement Curve in Log-Linear Form

2.2 THE IMPACT OF COMPETITION

TASC has identified two effects that the introduction of competition has on the cost behavior of producers as displayed by their cost improvement curves. One of these is an immediate decrease in unit costs, demonstrated as a downward shift in the curve. The other is an increased rate of cost improvement displayed as a rotation of the curve. Figure 2.2-1 illustrates the total effect of competition using the log-linear form of the cost improvement curve.

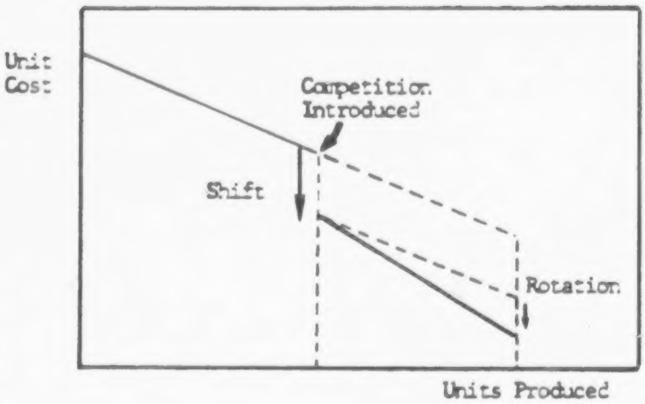
Unit Cost
Competition Introduced
Shift
Rotation
Units Produced

Figure 2.2-1 Benefits of Competition

TASC's analysis of several tactical missile programs clearly demonstrated the savings due to competition as evidenced by the shift and rotation of the cost improvement curve. Presented in Table 2.2-1 are the results of TASC's analysis.

TABLE 2.2-1

COST IMPROVEMENT CURVE SHIFTS AND ROTATIONS FOR SELECTED PROGRAMS

Program	Contractor	Shift (%)	Rotation (Percentage Points)
Sparrow	Raytheon	8	9
	Gen. Dynamics	7	11
Bullpup	Martin	14	11
Sidewinder	Gen. Electric	9	14
TOW	Hughes	15	31
750-Bomb	Letourneau	11	19
Average		11	16

Recent analysis has demonstrated that the magnitude of the shift and rotation is highly correlated both with the number of units produced on a non-competitive basis and with the slope of the non-competitive cost improvement curve. From this, TASC hypothesized a theoretical framework which correlates with the observed results as shown in Figure 2.2-2. The hypothesis incorporated an "optimal" or "best" cost improvement curve that one might observe if the manufacturer were under continuous competitive pressure from the outset.

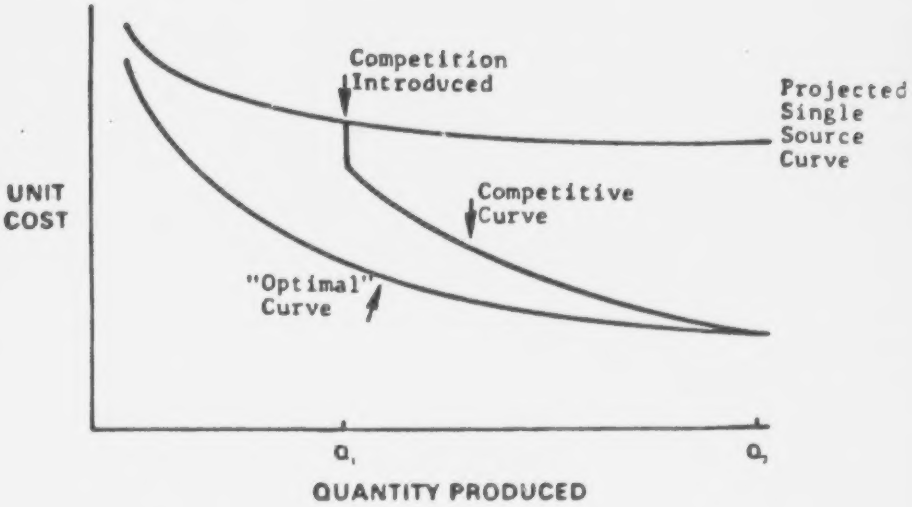

Figure 2.2-2 TASC Framework: The Impact of Competition

Detailed analysis was conducted on five dual source missile cases and eight electronics cases to test the hypothetical framework. The results of the analysis revealed that, on the average, the "optimal" curve could be achieved with no shift in the first unit cost and a four percent rotation of the cost improvement curve at the origin, assuming the manufacturer was under continuous competitive pressure.

The results of the analysis of the missile cases is presented in Table 2.2-2. Applying linear regression with the non-competitive slope as the independent variable and the "optimal" competitive slope as the dependent variable yields a significant correlation coefficient of .995.

Similar linear regression of the electronics cases yielded a correlation coefficient of .986. Combining the electronics data with the tactical missile data (yielding a sample size of 13) and performing linear regression in the same manner, yielded a correlation coefficient of .972. These results are displayed graphically in Figure 2.2-3.

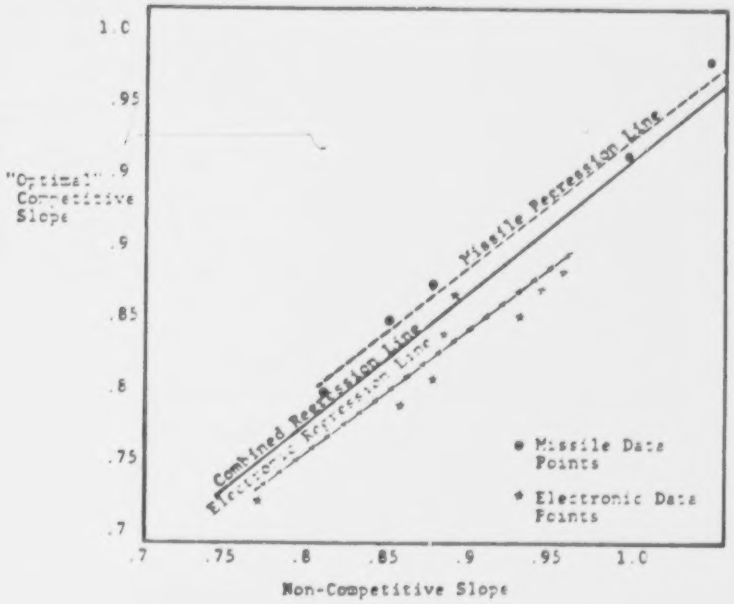

Figure 2.2-3 Correlation Between Non-Competitive and "Optimal" Competitive Cost Improvement Curve Slopes

The data analysis demonstrated that the flatter the non-competitive cost improvement curve and the larger the quantity produced prior to competition, the greater the potential for unit cost reductions from the original producer once competition is introduced. The observed shift and rotation of the

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original producer's cost improvement curve resulting from competitive pressure can be characterized as partially "making-up" for cost improvements which were possible but were unrealized due to the absence of competitive pressure. The earlier competitive pressure is applied during the production phase, the earlier the producer approaches his optimal curve, and the greater the total savings due to competition.

2.3 SECOND SOURCE BEHAVIOR

The obvious source of competitive pressure is price competition by the second source. TASC's continuing analysis of the missile cases has demonstrated the relationships between the first and second producers' cost behavior displayed in Figure 2.3-1.

The first source had a first unit cost represented by point A and followed the cost improvement curve so designated. After Q_1 units were produced by the first source, a second source began production with a first unit cost of B and followed the cost improvement curve represented by the dashed line. In each of the five missile cases, B was less than A and greater than C, the unit price achieved by the first source after Q_1 items produced. Also, in each of the five cases, the slope of the second source's cost improvement curve was steeper than the slope of the first source's cost improvement curve. On the average, the second source cost improvement curves were 5 percent steeper than the first source curves, and the first unit cost of the second source (B) was 25 percent less than the first unit cost of the first source (A). The results of TASC's analysis are presented in Table 2.3-1.

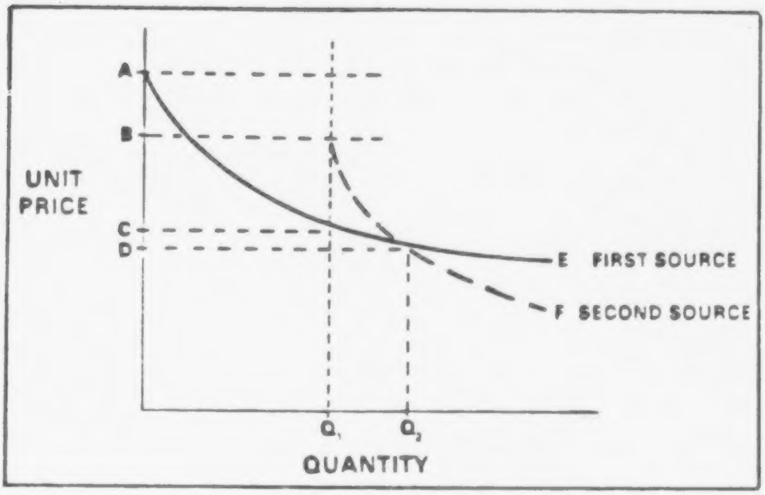


Figure 2.3-1 Cost Improvement Curves of First and Second Source

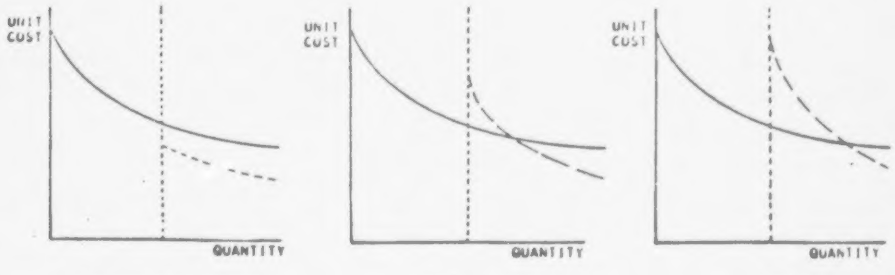
For the cases analyzed, the implication is that the second source begins production at, or very near, his "optimum" cost improvement curve. This enables the second source to rapidly approach cost parity with the first source during the production of his learning quantities. Following the learning buys, competition is introduced and the first source reduces his costs, as demonstrated by a shift and rotation of his cost improvement curve, to bring his price slightly below that of the second source.

TABLE 2.3-1

COMPARISON OF INITIAL COST IMPROVEMENT RATES
AND INITIAL UNIT COSTS FOR
FIRST AND SECOND SOURCE PRODUCERS

Program	Cost Improvement Rate of First Source	Cost Improvement Rate of Second Source	Percent Diff. in Cost Improvement Rates	Percent Reduction in First Unit Cost For Second Source
Sparrow	.87	.84	3	14
Bullpup	.82	.80	2	46
TOW	.98	.89	9	20
Sidewinder	.90	.83	9	17
FFG-7	.96	.92	4	+4

In addition to the missile programs, TASC analyzed the first and second source cost behavior of the eight military electronics cases and one guided missile frigate. The results are displayed in Figure 2.3-2.



ELECTRONIC SUBSYSTEMS

TACTICAL MISSILES

SHIP

Figure 2.3-2 Comparison of First and Second Sources Cost Improvement Curves

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The guided missile frigate was the most expensive and most complex item for which TASC acquired data. The cost of the first frigate produced by the second source exceeded by approximately nine percent the cost of the first frigate produced by the initial source. However, the slope of the cost improvement curve of the second source was approximately four percent steeper than that of the first source.

For the military electronics subsystems, competition was conducted with no learning quantities or educational buys for the second source. Furthermore, in the majority of the cases, the second source won the competition and began production at a lower cost than the first producer had progressed to at that time. The cost reductions are clearly apparent in Figure 2.3-2.

Viewed in its totality, the empirical data clearly suggests a relationship between the cost and complexity of a system and the nature of the cost improvement curve of a second source. For less costly and complex systems, a second source can be competitive from the outset. As cost and complexity increase, more time is required for a second source to be competitive. Furthermore, in all cases where there was sufficient data to permit analysis, the slope of the cost improvement curve of the second source was steeper than that of the original producer.

2.4 ADDITIONAL BENEFITS DUE TO COMPETITION

TASC's prior research has indicated that there are other potential advantages associated with competition. These advantages represent long term benefits in addition to the potential short term cost savings. Competition may strengthen the defense industrial base, improve mobilization and increase the quality and reliability of fielded systems.

Competitive firms may be more progressive in developing cost-reducing design changes and improvements in manufacturing technology in order to gain an advantage over, or to offset breakthroughs by, their competitors. Such progressiveness could have long term positive effects on U.S. industrial productivity, in addition to reducing costs on a current production run.

Competition may also result in enhanced mobilization capability and industry responsiveness. Competition serves as an incentive for contractors to develop productive capacity and increase efficiency through capital investment. The existence of an alternate production source improves prime contractor cooperation with the government in developing the subcontractor/supplier tiers, thus enhancing responsiveness to surge requirements at the prime and subcontractor levels.

Increased product quality and reliability are also potential benefits of competition. The dramatic increase in reliability experienced during the competitive phase of the Sparrow AIM-7F program is an example of enhanced product quality. TASC's prior research has indicated that improved product quality is best realized during competitive production when performance and quality are explicit production award criteria.

The additional potential advantages associated with competition, although not offering immediate benefits, represent long term investment returns. TASC's research has indicated that the realization of these potential benefits, like the cost benefits, is dependent upon careful planning and the formulation of a production strategy that incorporates program and industry characteristics.

3. PRODUCTION RATE

Prior research into the effect of production rate on unit cost has shown that unit cost frequently decreases with increasing production rate in a form virtually identical to that of cost improvement curves. However, traditional economic theory says that there are both economies and diseconomies of scale, and the curve should be U-shaped if one assumes the production capacity is fixed. The TASC formulation embodies both of these considerations as depicted in Figure 3-1.

The formulation assumes the existence of an optimum (most cost efficient) production rate, denoted R_0 in Figure 3-1. Typically, a manufacturer will arrive at this rate in an attempt

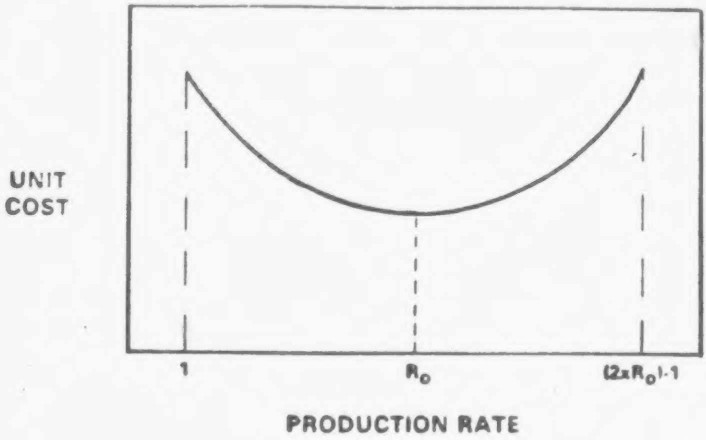

Figure 3-1 Effect of Production Rate on Unit Cost

to maximize profits by considering his facility limitations, capital investment/manpower requirements, anticipated quantities and rates to be procured by the government, and requirements specified by the government. It was further assumed that the curve should be symmetric about R_0. Thus, production costs are minimized when the production rate is equal to R_0, and increase as one deviates from R_0 in either direction. This formulation imposes the restriction that the maximum allowable production rate is $(2 \times R_0)-1$. For a manufacturer to produce at a higher rate, the production capacity would have to be expanded, thus producing a new R_0.

It should be noted that the symmetric shape of the production rate curve is an assumed shape. Other authors on the subject may contend that a curve of one shape (possibly the one chosen) should be used as one increases production rate up to the optimal value, and that a curve of a different shape be used as one increases production rate above the optimal value. TASC's data analysis has indicated that the specific slope of the production curve is determined by particular program and contractor characteristics. The flexibility of TASC's methodology enables it to incorporate these unique aspects. Detailed analysis of the five missile cases and eight electronic cases has indicated that the difference between cost estimates, generated using the symmetric production rate curve model, and actual costs is less than one percent.

4. UNIFIED METHODOLOGY

Combining the effects of both competition and production rate into a unified model results in the TASC Cost Improvement and Production Curve (CIPC) Model. Figure 4-1 displays graphically the resulting relationships.

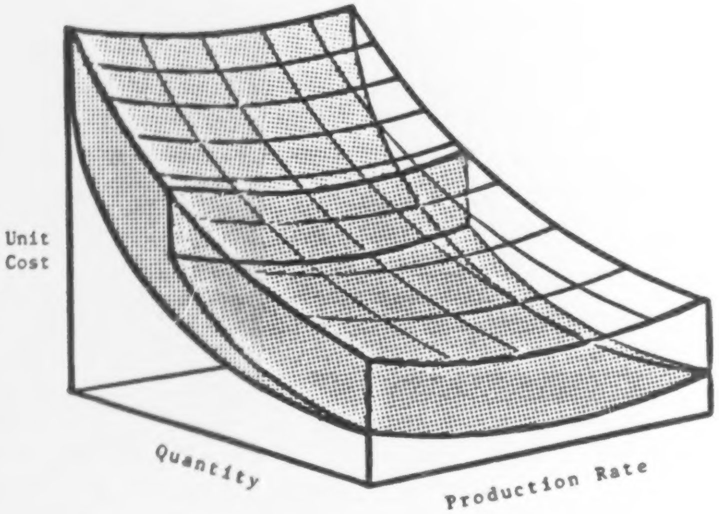

Figure 4-1 TASC Cost Improvement and Production Curve Model

Cost estimates for alternative acquisition approaches for individual programs are generated using the CIPC. It simultaneously considers cost improvement curve effects, production rate variations and the impact of competition on the recurring production costs of weapon systems and subsystems. The basic formulation considers unit production cost as a function of both total quantity produced and the production rate. Mathematically, this is expressed as follows:

$$Z = AX^{B}Y^{C}$$

where

Z = unit cost of the X^{th} item produced

A = constant (sometimes referred to as T_1 or "first unit cost")

X = cumulative quantity produced

B = coefficient which describes the slope of the quantity/cost curve

Y = (proxy) production rate in effect

C = coefficient which describes the slope of the rate/cost curve.

5. SUMMARY

The Analytic Sciences Corporation has developed, based upon extensive research and analysis, an analytic framework for predicting the cost benefits associated with competition during the production phase of weapon system acquisitions. This framework is consistent with prior historical studies and clearly demonstrates the benefits of competition.

TASC's own detailed analysis has shown that there are significant potential benefits associated with competition. The magnitude of the potential savings for a particular program is determined by unique program characteristics such as type of equipment, start-up costs, production rate and ultimate quantity, and the timing of competition.

TASC's analytic framework considers all of these factors for each particular program. In addition to assessing the potential cost reductions of a competitive acquisition strategy, the TASC framework is applicable to a wide range of Defense acquisition issues such as efficient production rates and multi-year versus annual contracting, and capital investment initiatives.

Chairman ROTH. I now call Mr. Woolsey, who is the former Under Secretary of the Navy, now I gather a practicing attorney.

We thank you for your patience. We regret it is so late in the morning, but we look forward to your statement.

As I said earlier, if you care to summarize it, we will include it in the record as if read.

TESTIMONY OF R. JAMES WOOLSEY, FORMER UNDER SECRETARY OF THE NAVY AND PARTNER, SHEA & GARDNER, WASHINGTON, D.C.

Mr. WOOLSEY. Thank you, Mr. Chairman.

I will go through this very briefly and perhaps in the course of it, since I have taken notes, I might be able to highlight some of the issues that have been of interest to the Senators, rather than just summarizing the statement.

At the beginning of it, I note that I have a certain sense of déjà vu about these hearings.

Ten years ago, as the brand new general counsel of the Senate Armed Services Committee, I organized, invited witnesses for, and sat through a set of hearings on the weapons acquisition process. As Senator Cohen mentioned earlier on, there is a certain degree of repetitiveness of some of the issues that come up in this field.

It is not entirely because nothing new happens. In part, it is because people solve one set of problems and—somewhat like hitting a featherbed—when you punch it down in one place, as President Roosevelt said about the Navy, it pokes up someplace else.

You frequently find yourself pushing to resolve terrible problems with one of the three parts of the trinity of program management issues—cost, schedule, and performance—and find out that you have solved one or even two, but created problems in another area.

I think that one important feature of the whole program management process is illustrated by a couple of things Secretary Carlucci said in part of the dialog he had with members of the committee about accountability.

We have had successfully managed programs, with all deference to Mr. Rule, managed by military officers, managed quickly and efficiently. In my view, those sorts of programs, such as the Polaris program, were so managed, in fact, because people were accountable.

When Admiral Raborn was given the Polaris program to manage and he put it to sea operationally 3 years and 11 months after President Eisenhower signed out the memorandum beginning it, he did so because he had the tools to do the job and because people were calling on him to do the job and he did not have a large number of people or institutions second-guessing him and looking over his shoulder.

The issue of high technology, I know, has been of concern to the committee, both from your letter to the witnesses and also from the testimony here this morning.

I do want to stress that technology, at least in my view, is not like a tree. It is neither "high" nor "low." It is a complex issue in that what you are after is, essentially, wisdom in selecting those parts of technology to push with respect to a specific weapons development and those parts to hold back. Or you may want to take the improvements which technology is offering to you in reduced costs and increased reliability.

I think the microelectronics revolution offers us a lot of opportunities over the next decades to have systems that are not always trying to use improved technology to give us solely improved theoretical performance, but also will enable us in many cases to have reduced costs and increased reliability, if we use it that way.

I think one important feature of the Carlucci reforms is focusing the attention of the Office of the Secretary of Defense at the beginning of the process—the requirements process—and reviewing that process. Because if you get that right, then a large number of other problems with the system are manageable, or they tend not to develop at all.

This has been one of the advantages of the design-to-cost programs that you were talking with Dr. Gansler about. The Navy has had several of these.

In effect, the frigate program was a design-to-cost program. The recently developed electronics warfare suite that is going on Navy ships was a design-to-cost program.

If one gets clear at the beginning of a program, when the requirements are set, what you are trying to do with respect to how much you are stretching technology to meet more requirements and how much of its improvements you are going to use to, instead, have lower costs and better reliability, you can do a great deal. A great deal of our difficulty with the weapons acquisition process is that we focus so much attention and effort on the latter ends of it—even after the engineering development decision is made—and look so hard at inflation estimates, and reporting systems, and so forth, for systems which are already in engineering development, that we are chasing something which we should have focused on years before.

I think that the reforms that Secretary Carlucci has suggested, for focusing the Office of Secretary of Defense's attention on the requirements process at the beginning of a weapons development cycle and on the engineering development decision, are essentially the two key points. Those are the places where the senior officials' review ought primarily to be focused.

Senator Rudman was talking earlier about the possibility of using scientists, such as those on the Defense Science Board, to a greater extent in examining military requirements, and Senator Pryor was asking Dr. Gansler about the military-industrial complex.

On these two issues, it seems to me that there is a very real sense in whch we do not have nearly enough cooperation between the various parts of the military industrial complex. In a sense, the adversarial relationships which are appropriate to the private sector in the business world frequently don't provide the best, quickest, and least costly ways to develop new weapon systems.

One looks at the sort of teamwork the British had, for example, in the late thirties and early forties designing radar for the first time. There were close working relationships between their scientists, people in the commercial world who were working the problem, and their military officers. All were out in the field conducting operational tests and evaluations of the system as it was evolving. That sort of teamwork approach towards developing and designing new weapon systems is the sort of thing which our structure tends to force us away from.

To my mind, in many ways, increased teamwork and increased cooperation of that sort by the various parts of the military industrial complex is probably far more desirable than what we see today.

I agree with a great deal of what Jacques Gansler said about cost estimating and about the importance, particularly, of moving to increase competition by having dual sources.

You asked him a number of questions about that that laid out the issues very well. I would simply add that we do some dual sourcing now, even on major systems.

In the Navy, we have two sources for the new 688 class submarine. We have two for the new class of frigates.

One frequently does not have dual sources for new aircraft procurement, even after a competitive development, but it is possible to do a great deal with dual sources for subsystems, for subcontractors, for components, for pods, let's say. As we move into a world in which weapon systems are far more modular, in which it is possible to do to ships what we are beginning to do now to aircraft—modernizing them by changing pods that are attached to the aircraft, rather than by having to design an entirely new aircraft—we open up chances for competition. I think we will begin to see a great deal of opportunity for dual sourcing for those smaller components.

It is expensive—and there is always the argument at the beginning of a system's development about how worthwhile it is to go into dual sourcing for the entire weapons system itself—even though we do do it from time to time. But for subcomponents, I think dual sourcing may be far more practical, now especially with the microelectronics revolution, than it has been in the past, and we have a great deal of opportunity there.

I think that one of the major issues raised by both Mr. Rule, and earlier by Senator Mattingly in questioning Secretary Carlucci, is the competence and the degree of responsibility of our career civilian people in the acquisition process. We are losing them at a very high rate today.

There is a piece on the "op. ed." page of the New York Times this morning by Daniel Boorstin about the pay cap problem in the executive service. He indicates that the cost of living has risen 55 percent since 1977, during a time that Federal executives have received only a 5½-percent pay increase. He adds that, whereas in 1978 only 15 percent of the people who were eligible to retire from the Federal civil service retired, last August, 1980, over 40 percent of those eligible to retire did so. I think that any acquisition system has to have a good deal of institutional memory in the part of the institution that conducts the acquisition. Our institutional memory in Defense, and certainly our ability to conduct a decentralized management system with more responsibility for the service secretaries and their immediate staffs, both depend heavily on having able career, senior civilian, and military, managers with the sort of seasoned judgment that Gordon Rule has.

You are losing them today in a hemorrhage from Government. And I think that very little that is done, procedurally, to improve various parts of the structure of the weapons acquisition system is going to have a very positive effect over the long run without checking that hemorrhage.

I will close with that, Mr. Chairman.

Chairman ROTH. You and a number of others have discussed the desirability of having competition at a lower tier level, lower than the prime contractor. How do you proceed with that approach? Would this actually be required in the prime contract? What do you propose?

Mr. WOOLSEY. Several things are needed. Obviously, we cannot throw more money at a defense program which has only very few subcontractors, some of them in monopoly positions, in the short run and expect to get efficient production, but there is a dilemma because without long-term stable orders, those subcontractors are not going to come back into the business.

We can't force them to come in. They have to be encouraged to come back. For a number of years, for example, we have been building 1 attack submarine a year while the Soviets have been building 10. When you are building one attack submarine a year, you have people go out of the business of producing pumps, valves and all the things you need for submarines. So you have several subcontractors now in a monopoloy position, which tends to drive up the cost of things that go into submarines and, therefore, of the submarines themselves.

One has to have a graduated increase from the lower levels of defense procurement where we are now, and at the same time do the sorts of things that Jacques Gansler was talking about—selectively having Government involved in giving contractors an incentive to train certain types of workers, to take over operation of Government-owned facilities, and even to open up new facilities as Government-owned, contractor-operated (GOCO) facilities to compete with existing contractors.

Those sorts of things really have to be done on a case-by-case basis, but they cannot be done outside the framework of an overall increase in the procurement levels.

If we keep building one submarine a year, no matter what we do in these other areas, these subcontractors are not going to come back into the market.

Chairman ROTH. You mentioned the problem of loss of key personnel. I understand that you recently wrote an article in the Washington Post which deals with the other side of the problem, that rarely, if ever, is anyone fired because of overruns.

You may have heard my question to Mr. Rule. How do we make every individual, procurement specialists, understand and appreciate the importance of cost? Do we have adequate procedures now in the Department of Defense, or evaluations making it clear that one's future career, much like the military officer on the ship, depends on their success? Is cost a major factor in evaluating personnel?

Mr. WOOLSEY. It is when the program is focused that way. It would have been a serious matter for the frigate program or for the design-to-cost electronic warfare system I mentioned, if the program manager had exceeded his cost targets, because that is what he was being told to control.

I think we can do a good deal more design-to-cost on procurement of major systems than we have in the past.

If you just tell someone to go do everything right about this program and you don't differentiate, he is likely to let costs slide and to meet his requirements for quality and his requirements for schedule. But if you select those programs which are not supposed to be pushing technology, because they do not have to, and make cost the criterion on which you judge him, and write his efficiency reports on that basis, then, yes, I think you can do it. But you cannot do it on all programs and you probably shouldn't. You can also use the CAIG. Mr. Margolis was testifying here earlier. He has a long and distinguished career in the Defense Department in cost estimation. You can also use the CAIG as a check on cost estimating.

You can, in some subtle ways, give some publicity to poor estimates coming out of program offices. It requires effort on the part, particularly, of the service Secretaries and the service chiefs but it can be done.

I do think very much that decentralization of responsibility for this sort of thing to the military departments—I say "departments" rather than "Services" because I am talking about the service Secretaries and their immediate staffs—is an important way to try to handle this sort of thing.

You cannot do it all from the Office of the Secretary of Defense. There are too many offices and programs involved. Those people are too far away from the issues. You certainly cannot do it from OMB and you certainly cannot do it from the Congress. Your service Secretary and, I think, his immediate people, uniformed and civilian, have to be at the cutting edge of this type of management. If they care about it, if they emphasize with respect to a wider range of programs the importance of costs, if they lean on people, if they see that people who do not do well as program managers do not get good next assignments, that sort of message gets around very quickly. But it has to be done at a level at which the managers, the people involved, have the tools to do the job. And to my mind, that is not a level as high as the Office of Secretary of Defense and it is certainly not on a level outside the Department of Defense.

Chairman **Roth**. My final question is with respect to a Secretary McNamara innovation. It is my understanding that he set certain cost reduction goals as part of his program and that while there were problems with establishing these goals, it did help to create consciousness of the importance of cost cutting. This has not been done in the Carlucci Memorandum. Would you recommend that this approach or concept be adopted?

Mr. **Woolsey**. I would try it at the service Secretary level, Mr. Chairman. I am not familiar with the details of that particular McNamara initiative. I first came to the Pentagon when Secretary Clifford was Secretary and then as a Lieutenant in the Army. But I do believe that several of the very valuable things Secretary McNamara tried to do over the years have cracked up on the rocks of dispute between the military departments and the services on the one hand and the staff in the Office of the Secretary of Defense on the other. I would use the latter far more in a monitoring role, and try to put the onus on the Service Secretaries and Service Chiefs to come back to the Secretary of Defense with programs for that type of targeted cost reduction, rather than trying to do it out of the Secretary of Defense's Office.

Chairman ROTH. Thank you very much, Mr. Woolsey. We will leave the record open in the event there are further questions on the part of the panel. I would hope that you would answer them.

Mr. WOOLSEY. Certainly. Thank you, Mr. Chairman.

[Mr. Woolsey's prepared statement, responses to written questions submitted by Senators Roth and Sasser, and articles from the Washington Post follow:]

Statement of R. James Woolsey
Before the
Senate Committee on Governmental Affairs
October 27, 1981

Mr. Chairman and Members of the Committee, I am honored to accept your invitation to appear today to testify before you as you assess the management of the acquisition process in the Department of Defense. I am struck by the perennial nature of the issues involved in part because one of the first tasks I undertook a decade ago, as the brand-new General Counsel of the Senate Committee on Armed Services, was to organize a set of hearings on the "Weapons Acquisition Process." Many of the problems and solutions set forth by the witnesses before that Committee in 1971 have features in common with prior diagnoses, as well as with those in the intervening years and with those of several of your witnesses last week.

I mention this not as a counsel of despair. Indeed I think some progress has been made in recent years -- for example, as a result of some of the "fly before buy" reforms of Secretary Laird and Deputy Secretary Packard and also as a result of Secretary Brown's and Under Secretary Perry's relaxing of some of the rigidities of the Defense System Acquisition Review Council (DSARC) process. And generally I am quite encouraged by the direction of initiatives that Deputy Secretary Carlucci took in his memorandum of April 30 of this year.

But I became convinced during the years I served as Under Secretary of the Navy that procurement reform is a perpetual job. It should not be surprising that many of these problems recur, in part because many acquisition problems are themselves caused by solutions to other acquisition problems solutions too zealously or too generally applied. If one focuses exclusively, for example, on controlling one of the trinity of issues that confront any weapon system program manager -- cost, schedule, or performance -- one is apt to create problems in the other two. If we get so exasperated with delay, e.g., that we seek to have a great degree of concurrency between development and procurement for a large number of programs, recreating the success of the Polaris program many times over (Admiral Raborn had a Polaris-carrying submarine at sea on operational patrol only three years and eleven months after President Eisenhower signed the memorandum initiating the Polaris program), then we will find that we have a number of systems -- as we have today -- that have been pushed so quickly that they are well into production before their development problems are solved. By the same token, if we delay almost all programs in order to do prototyping, operational testing, and many other worthy risk-reducing things as well as fully to satisfy all the various interests and institutions that like to get involved in the weapons acquisition process, we will never get anything done. Many systems are lucky today if their Mission Element Need Statement, their Arms Control Impact Statement, and their Environmental Impact Statement have all been approved within the time that it took Admiral Raborn to begin, conduct, and compelte the Polaris development. So I start from a conviction that there are no panaceas, or even near-panaceas, in weapon development and procurement.

High Technology

Are we creating problems for ourselves by excessive reliance on costly "high" technology? We must recognize that what we are about is coping with uncertainty in the face of a resolute adversary who has out-spent us between a quarter and a third of a trillion dollars on the military over the last decade. This is roughly -- in today's dollars -- what we spent on the Vietnam War. In other words, the Soviets have called our Vietnam War costs, and they raised us a war's worth of spending. And they still have most of what they spent their money on, while much of what we bought lies rusting in the jungles of Southeast Asia. Moreover, they spend only about a quarter of their much higher military budget on manpower and about half on weapon development and procurement, whereas for us those proportions are approximately reversed. There is clear evidence of this in the fact, fully documented in Secretary Brown's last posture statement, that Soviet military production lines -- across the board -- are running at two tc five times the rate of ours, and some far faster. It was a continual source of frustration to me, as Under Secretary of the Navy, to see them lay down a new attack submarine once every five weeks while we could only afford to lay down one a year.

Nor is it true that the Soviets support this massive investment merely by buying simple cheap weapons. The military sector is about the only sector of their economy that is technologically advanced, but it is no less capable for that -- and it is certainly no producer of primitive equipment. The Soviet Navy is procuring nuclear-powered surface ships, extremely capable sea-based air defense systems, air-cushion vehicles for naval infantry assault, fast titanium-hulled submarines (that we could not begin to afford to build), the Backfire bomber firing long-range stand-off cruise missiles, and many other technologically advanced and sophisticated systems. Soviet tactical aviation is no longer dominated by relatively simple aircraft such as the MIG-21 -- their investment in sophisticated swing-wing tactical aircraft, procured in large numbers, in their own version of an AWACS radar aircraft, and in many other such programs has been striking in the last few years. Their land forces are equipped with a tank only slightly less sophisticated than our own M-1, but it has been in the field for years and its more sophisticated successor is well into development; their deployed armored personnel carriers and air defenses are far more capable than ours and in most other aspects of land warfare -- e.g. armed helicopters -- their systems are at least the equal of ours. Their sophisticated developments in strategic forces have been well-publicized, but I would merely note that in addition to their massive new ICBM deployments, they are building ballistic-missile nuclear submarines at a rate 4 to 5 times what we are, and that the newest class of them is larger than our Trident submarine and carries a missile of roughly equal range.

I make these points because I think it is important to understand that acquiring weapons for defense is qualitatively a very different kind of problem than, say, building a dam, flying to the moon, distributing social security checks, and virtually all of the other enterprises of government. I understand that Einstein used to say "Raffiniert ist der Herrgott, aber boshaft ist Er nicht," which I would roughly translate as "God may be shrewd, but He's not plain mean." I would interpret that to mean that when one is attempting to accomplish something and the only "adversary" is nature, one may face a complex and difficult problem, but there is no one on the other side -- e.g. when you are trying to discover a principle of physics or to get to the moon -- who is malevolently trying to outwit you. In military matters, that's not true -- there is someone on the other side, continually trying not only to make your job harder but, if it comes to that, to be able to kill you. So decisions about weapon acquisition are not merely a matter of abstractly finding an optimum, inexpensive degree of "sophistication" and buying it. It is unfortunately true, for example, that new generations of Soviet submarines are considerably quieter than their predecessors, that you need better and better sonars to find them, and that better sonars tend to be more expensive and often also bigger and more sophisticated than smaller, cheaper ones. We often lost sight of this sort of thing, I beleive, in our critique of excessively complex modern weapons.

Still, it is certainly true that the requirements for military systems have too often been written in such a way as to stress existing technology in order to provide, say, 99 per cent of what is theoretically possible, when settling for 90 per cent would have significantly reduced cost and increased both reliability and ease of operation.

I am particularly encouraged by two of Secretary Carlucci's reforms in this regard. I believe that his proposed heavy emphasis on pre-planned product improvmeent and his decision to concentrate the attention of the Office of the Secretary of Defense on only two of the four DSARC review points are both wise and important steps.

The first of these -- pre-planned product improvement -- will, one would hope, enable us to have more systems that can be readily modernized without being scrapped and replaced -- much in the way that we have been able to modernize our aircraft carriers over the years by changing the aircraft on them. For example, I approved several years ago the Navy's development of a vertical launch system for its surface ships (i.e. small "silos" in the ship's deck, obviating the need for launchers dedicated to a specific missile); this should enable future surface ships to receive modernized missiles, or to change their loadings from one type of missile to another (e.g. air defense to land attack), without costly modifications each time. This was pre-planned product improvement before we called it such. I believe this concept could be carried even further so that more of a ship's weapons and sensors could be modular, and therefore relatively easily modernized or replaced, somewhat the way pods can be changed on an aircraft. The microelectronics revolution is making such an approach more reasonable all the time, since it enables us to put more and more of a weapon's or sensor's computing capacity in the weapon or sensor itself rather than in some central computer in the ship. This is only one way that revolution can be turned toward reducing cost and complexity, but it will take time because we have a large investment in ships with the electronics of a decade or more ago, and you can't reshape the electronics of an existing ship, or even one well along in design, except at exorbitant cost. Ships which are just now at the beginning of their design phase -- and thus realistic candidates for a heavily modularized design -- will not be in the fleet until well into the nineties and will spend almost all their service lives in the twenty-first century.

By concentrating centralized review of weapon system decisions at the points of: (a) approving requirments and (b) approving full-scale engineering development, Secretary Carlucci has hit the two most crucial points in a system's life-cycle. The review procedures for full-scale engineering development are relatively well-developed and understood, but it is at the point where a system's requirements are validated that most of its problems and prospects are born. This is an appropriate focus of attention for the Secretary of Defense and his principal advisors -- this is where we have, in the past, too often gotten locked into systems that strive for 99 per cent of what the technology can do, regardless of cost.

There is one additional point I would suggest here, however, an issue stressed by Mr. Murray in his testimony to you last week -- namely, the importance of operational test and evaluation. He emphasized the desirablility of a centralized control of such testing in the Office of the Secretary of Defense and the desirablility of conducting it on developed systems before they are procured. I would take a somewhat different tack, and stress the importance of operational test and evaluation throughout the development process, including in the setting of requirements. Admittedly one must have something to test and, early in the process, one is not going to have a full system. In this connection, however, I would point out the possibility of using, in some cases, bread-board systems rigged to simulate the weapon, sensor, or device that is to be developed. It takes a good deal of ingenuity to do this, especially in operationally realistic circumstances (and using real troops, not contractor personnel), but the insights can be much more rewarding than the paper studies and contractor briefings that have come to dominate the requirements process. We can hope that one result will be that even systems that must necessarily accomplish sophisticated tasks will be more easily maintained and less complex to operate than many we see today. A fascinating examination of the role of operational tests in setting requirements is contained in Jack Stockfisch's book, Plowshares Into Swords. I would, however, use the staff of the Office of the Secretary of Defense to monitor and critique the Military Departments' operational testing and other requirements-setting efforts, not to do the testing themselves. This sort of thing requires a lot of operational experience and flexibility to be done well. One wants, I believe, to give the Military Departments an incentive to do the job right, not do it for them.

I have concentrated on these efforts, pre-planned product improvement and requirements approval, because they affect the beginning of the acquisition process and thus, I believe, have the greatest opportunity for positive effect -- but even if they are implemented flawlessly and immediately, you will not begin to see a major effect on deployed systems for a decade or more.

Cost Estimation

Program instability and inaccurate inflation estimates account for an average of over two-thirds of program cost growth. I will turn to the former in a moment, since many of Secretary Carlucci's proposed reforms are really an effort to reduce program instability once a program has entered engineering development. The latter is primarily a problem of politics.

As the House Armed Services Committee has recently reported and as one of your witnesses, Mr. Jacques Gansler, has recently pointed out in his book, Defense Industry, the problem of inflation in defense costs is importantly influenced by the difficulties of defense sub-contractors. Many have gotten out of the defense business over the years because of the much greater demands of regulation, inspection, and the like that companies face in trying to do defense business and others have dropped out because of lack of orders. When we go for several years, e.g., beginning construction of only one attack submarine a year, we don't provide enough work to keep many suppliers of submarine components in the business. Thus various scarcities of parts and components, and monopoly positions held by such sub-contractors, have contributed a great deal to the high inflation rate for many weapon systems -- higher than the rate faced by industry as a whole.

The reasonable way to handle this problem is to: (a) recognize it and adjust for it; and (b) take steps to rectify it by increasing the incentives for other subcontractors to enter, or return to, defense business. The second step will, I would hope, be an important part of Secretary Carlucci's efforts to increase competition in defense industry, including the establishment of second-source suppliers when feasible. Unfortunately such steps will almost certainly require early costs and investments to yield long-term savings.

The first step is, however, even harder. Any administration has a dual incentive to understate inflation in defense. First, it must be officially optimistic about the effect of its overall program to reduce inflation in the economy and allowing exceptions, such as Defense, dilutes the public effect of such optimism. Secondly, officials in the White House, particularly in OMB, perpetually see unrealistically low inflation estimates for Defense to be a good, low-visibility way to hold Defense's feet to the fire and require Defense cuts without raising the political difficulties caused by cancelling major weapon programs. If, for example, inflation in the economy is projected by private forecasters to be 10 per cent for the coming year and, say, 13 per cent for defense procurement, an "official" forecast of 8 per cent inflation for defense procurement can permit the following: a 12 per cent growth over the previous year can be portrayed as a 4 per cent "real" increase in defense, while in fact it is a 1 per cent "real real" cut. The next step is for OMB, later in the year, to adjust upward its deflator for defense procurement but to require that the increase be taken largely or entirely from some other part of the defense budget, usually out of the readiness accounts. Unless a weapon program, however, is entirely relieved of the impact of OMB's early mis-estimate, and this is rarely the case, the result that you see here in the Congress is chagrinned uniformed program managers parading over to explain yet another set of "cost overruns." The next time I suggest you might want to summon the Director of OMB and his staff instead. I have attached two recent articles I have published, criticizing both the Carter and Reagan defense inflation estimates. I would heartily endorse the recommendation that CBO Director Alice Rivlin made to you last week that the Congress encourage, or even direct, that the Department of Defense use special deflators. I see no reasonable prospect that any Administration will take such a step.

The sums involved in these inflation estimates are significant. Even a shift in one per cent in inflation assumptions can dwarf the effect of adding, or terminating, a major weapon system.

Increased Competition

Although the objective of increased competition in defense procurement is pleasing to state, it is difficult to implement. This is in part because, both inside and outside the Pentagon, this is often taken to mean that it is desirable to have more classical competition in the sense of bidding for firm fixed-price contracts. Indeed in years past, under the concept of "Total Package Procurement", fixed-price contracting of one kind or anothewas extended to cover development and design as well as procurement. In once case it was used to cover an entire class of new Navy destroyers, being built in a brand-new shipyard, using radical new modular construction techniques. The effect of this type of "increased competition" was disastrous. We were still picking up the pieces of that particular contract and reading about the mess in naval shipbuilding a decade later.

Suffice to say that "increased competition" is a relatively complex thing to bring about in defense contracting. Whatever it means in any given case, it should not be taken to mean uniform allegiance to the fixed price principle even when there are significant development uncertainties in a new system. Otherwise the government runs the serious risk of seeing a contractor buy in with a low bid and then recoup its losses by filing claims or negotiating high prices for necessary follow-on procurements once it is the sole supplier. The Navy has moved in recent years to cost-type contracts for lead ships of a class, followed by fixed price contracts for the following ships -- in my judgment a far more reasonable approach than the superficially more "competitive" total package procurement for design and construction of a whole class of ship.

"Increased competition" can mean things as various as giving a new potential subcontractor special incentive to get him set up in a business where there is now only one supplier, or improving the quality of various government laboratory personnel to help make the government a smarter buyer of new technology. "Increased competition" is a positive thing, but it does not wear only one mask.

The Carlucci Reforms

I have indicated above my views on a number of Secretary Carlucci's recent reforms. Many of those I have not discussed are designed to: (a) increase the stability of development and procurement programs once it is decided that a system will enter engineering development; and (b) decentralize implementation of weapon development and procurement while maintaining appropriate authority for the Secretary of Defense.

I agree with the direction of both types of reforms. Both depend heavily, however, on forces outside the control of the Secretary of Defense in order to be effective. Congress will, directly and indirectly, be instrumental in the effectiveness of such reforms.

Stability in the procurement and support of programs, the lack of which accounts for over 40 percent of program cost growth in recent years, has been seriously damaged time and again by Congressional action. Congress cut the President's requested defense budget every year for 15 years from 1965 to 1980. In a number of those years it added funds for major weapon systems. The more-than-compensating reductions came heavily, every year, out of readiness -- spare parts, training, ammunition, and the like. Certainly the defense acquisition system bears heavy responsibility for setting requirements for, and designing, weapon systems too complex to maintain easily. But Congress has seriously compounded the felony when it has cut the spare parts, training, and ammunition which were necessary to make such complex weapons more than marginally and occasionally effective.

We need to work hard to make the next generation of weapons simpler to operate and maintain -- the microelectronics revolution offers us some opportunity to do that. But today's complex systems, such as F-14 fighters, are going to have to be what we use to shoot down, e.g., attacking Libyan jets for the next several years. They can, as they have demonstrated, do the job if they are well-maintained and operated -- but it does not help bring about the day when weapons will be simpler to operate and maintain to starve existing systems for spare parts and ammunition or to cut the training of those who operate them. The supply of neither is yet adequate, and further cuts in such accounts will only exacerbate the problems.

Unfortuantely, near-term cuts in defense outlays must come heavily out of such readiness accounts because those are the accounts from which funds are spent quickly. A billion dollar cut in outlays, for example, if taken by eliminating new ship construction, would entail more than a $10 billion cut in appropriations, because less than 10 per cent of newly-appropriated shipbuilding funds are spent in the first year of the appropriation (they will be spent over, say, a 6-7 year period, peaking around the 4th year). So, when they are faced with near-term cuts in outlays, decisionmakers are driven to cut accounts that are largely spent in the first year of appropriations, such as the readiness accounts. Congress should be aware that near-term cuts in Defense outlays are likely to exacerbate the very problems of complex, hard-to-maintain systems that this Committee is trying to ameliorate.

Alternatively, in any given year, procurement quantities from an ongoing production line may be cut to meet late reductions forced by OMB or Congress. This typically requires overhead to be spread over fewer and fewer systems, further increasing their unit cost. Unit costs can be held down, and some of the huge backlog of deferred procurement from the Vietnam years and the late 70's can be made up, if defense budgets are adequately supported for the next few years. I appreciate the high interest rates and other problems caused by a large federal deficit, but the level of defense spending currently being requested is certainly not excessive compared to either the large Soviet challenge or to our history of modern peace-time commitments. President Reagan -- by proposing a return to spending about 6 1/2 per cent of GNP on Defense -- has only suggested moving about one-third of the way back from President Carter's level of commitment (5 1/2 per cent of GNP) to the level under Presidents Eisenhower and Kennedy (8 1/2 per cent). Certainly one should not assume that any given proportion of GNP should be spent on defense, but it is hard to call the proposed increases, in historical context, a proportionately large national sacrifice.

Cuts that are spread out, rather than taken by terminating one or more large programs, will tend to increase unit costs and reduce readiness in a large number of defense programs. They will also directly undermine Carlucci initiatives 3, 4, 5, 6, 9, 10, 11, 12, and 18 -- although some amelioration might be provided by Congress's approving number 15, e.g. by allowing more flexibility to Defense managers by increasing the reprogramming ceilings.

These reforms point toward giving more responsibility to the Military Departments — I say "Departments" and not "Services" because I think the Service Secretaries and their staffs can be extremely important links in Pentagon management. They must be used, as Secretary Carlucci apparently intends to use them, as part of his and Secretary Weinberger's team, not as adversaries to the staff of the Office of the Secretary of Defense. This will not be easy and it will take hard work [illegible] talented people, but I think it is the only way one can reasonably hope to manage an enterprise the size of the Department of Defense.

In my view there is one step that, more than any other, will determine whether the Carlucci initiatives are successful. I applaud their direction, but neither they (implying, as they do, more decentralized management with fewer formal checks and controls by both Congress and the Office of the Secretary of Defense) nor any other type of improvements in Defense acquisition management can possibly succeed without skilled and experienced civilian and military managers to carry them out. I have been pleased to see recent increases in military pay; I believe these will help the military to retain some of the skilled people needed to manage the acquisition process.

But career civilian managers are an important part of the acquisition system. Frequently they provide the institutional memory in contract administration offices, in laboratories, and elsewhere in the process as the military officers rotate through. These career civilian acquisition managers provide an important element of seasoned judgment about such matters -- which can never be derived from fixed formulae -- as the best type of contract for a given procurement, or whether the state of technology will permit more or less concurrency in a weapon development. They can, and do, make or break any system of weapon acquisition. The civilian pay cap which today leaves the best of them no hope of financial advancement and assures them that inflation will continue to cut their salaries, undermining their hopes of better higher education for their children and the rest, is in my judgment the single remaining most negative and destructive government policy standing in the way of effective reform of defense acquisition.

RESPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

Question 1. Do you think Congress and the Secretary of Defense oversee the operations of the Defense Department in an effective manner?

Answer. Not effectively enough, but I believe there are sins of both omission and commission.

From Congress point of view, I believe the most effective type of oversight is often the detailed investigation of a specific program that has gone awry. The reason is that these issues are typically very complex and require a rather thorough understanding by both staff members and members of Congress to get beneath the superficialities of cost increases, delays, or inadequate capabilities. For example, I believe that the investigation of the M-16 rifle procurement done some years ago by the investigative subcommittee of the House Armed Services Committee, relied upon heavily by James Fallows in the chapter on that subject in his recent book "National Defense," is a model of its kind. Although there is a certain frustration involved, inevitably, in the Congress when one is looking into a program that has already developed massive problems—and an understandable desire to come up with new statutes or regulations to keep such things from happening again—I believe that the shock waves sent out by a thorough and effective investigation of that kind are beneficial indeed in educating those in the executive branch who are responsible for managing Defense programs.

Frequently, in my view, the effect of such well done investigations is more useful than levying yet further reporting requirements and data demands on the Department of Defense. Program managers within the departments spend far too much time already briefing those above them in the executive branch and in the Congress and providing them with reams of data—and not enough time managing their programs and solving problems. But in order for effective Congressional oversight to be effected by investigations such as that which was conducted into the M-16 rifle scandal there must be someone with some permanence in the executive branch who will see the lessons and learn from them. I firmly believe that the most destructive thing we can do with respect to procurement reform in the Department of Defense is to drive talented people out of the government—both military and civilian—by such policies as pay caps. Most failures of Defense procurement are failures in judgment, not failures to follow a specific, discoverable, rote process. With better people you get better judgment. Therefore, although I would certainly not suggest doing away with the various procedures—hearings, briefings, provision of formal reports, etc.—by which Congress is kept generally informed, I think that good indepth Congressional investigations and retaining able career people in the executive branch are of central importance.

Question 2. What incentives are there for program managers to ensure that weapons are built in the most cost-effective manner possible? What incentives are there for the contractors themselves?

Answer. "Cost effectiveness" and its corollary—highly quantified measures of both cost and effectiveness—have, in my view, been exaggerated as the all-purpose criterion for assessing military programs. To often they have led us to base judgments on trying to quantify the unquantifiable and to denigrate the military importance of flexibility, timely exploitation of a potential enemy's weaknesses, ingenuity, and guile. R. V. Jones's "The Wizard War," which chronicles the development of radar and other systems in England in World War II, seems to me to set out a far more reasonable approach toward weapons development than our current focus on cost effectiveness, which is far more similar to the Germans' method of weapon development during the war than the British.

If one wishes to include within the definition of "cost-effectiveness" these broader concerns, then I would say that the elements that are needed to improve weapon development include: greater involvement of operational test and evaluation in setting requirements; smaller development teams; more responsibility for program managers; less contractual formality and more teamwork between the military, the intelligence agencies, and technical people in industry and in the Defense Department; fewer reviews and data requirements levied by Congress and other layers in the Executive Branch above the program manager; and greater attention to modular and incremental changes to move improvements out of the laboratory and into the field more quickly.

Question. 3. Almost every Secretary of Defense has tried to stop the waste which occurs in major acquisitions. Have any of them made a dent in the problem? Do you believe Secretary Weinberger's efforts will prove to be any more successful? If not, why?

Answer. I believe Secretary Weinberger is on the right track, but his reforms may not go far enough in the direction described in the answer to question 2, above. His efforts toward decentralization, toward review by the Office of the Secretary of Defense at only two major decision points for each weapon system, and toward efficient rates of procurement all point in the right direction.

But more major surgery on the process, especially the methods by which requirements are set, may be necessary if we are to see the quick, effective and relatively inexpensive types of military developments of which we are capable when we set our minds to it—e.g. Bill McLean's Sidewinder, Kelly Johnson's U-2 and SR-71 aircraft, and the Agena D rocket.

Question 4. Do you believe the Defense budget for fiscal year 1982 complements the Carlucci initiatives? For example, program stability was one of the touted purposes of the initiative and yet we now have a new B-1 bomber, the MX missile, the "Stealth" bomber, a new D5 missile for the Trident 2 submarines and research on a massive new communications system which is designed to operate during nuclear war all added on top of existing weapons programs which are already straining the Pentagon budget and causing instability in existing weapons programs. Isn't this inconsistent with the Carlucci initiatives?

Answer. I don't beleive that good procurement procedures guarantee wise decisions on which programs to pursue any more than good court procedures ensure that we will have wise judges and juries. They merely give wisdom a chance.

Program instability that arises from a major policy change by a new Administration about a new program, such as a decision to deploy the B-1 or to cancel the multiple protective shelter basing system for the MX, is not going to be driven by questions of procurement program stability. But for many established programs, questions of whether to stretch out a procurement or to buy a system at more efficient production rate would, and should be, affected by such considerations as those discussed in the Carlucci initiatives.

Responses to Written Questions Submitted by Senator Sasser

Question. Mr. Woolsey, you make some excellent criticisms in your prepared testimony about how weapons acquisition cost overruns affect other parts of our Defense budget, especially our "military readiness accounts."

These operations and maintenance accounts are what we use to keep our weapons systems operating. They are the accounts we use for supplying these weapons with spare parts. It is penny-wise and pound-foolish to keep cutting these accounts and still maintain that we are in a state of high "military readiness."

So, I have two questions. First, shouldn't we move to a total weapons systems budget that could include a suitable "military readiness" account in order to keep a weapon system fully operational for its life cycle. And, second, could you provide some further information to the Committee on how badly reductions in "military readiness" accounts affect the day-to-day operations of our major weapons systems that we have spent so much to produce.

Answer. Some attempt is made, when decisions on weapons systems are approved in the various considerations of the Defense Systems Acquisitions Review Council (DSARC), to assess the costs of readiness and operations as part of "life cycle costs" of individual weapons systems. Life cycle costs are also taken into account, on an ad hoc basis, in various budget debates within the Department of Defense as decisions are made each year whether to fund a weapons systems development or procurement. One will hear arguments, for example, about what discount rates ought to be used in order to establish present values for two competing weapons systems—for example, one that is cheaper to procure but more expensive to operate in future years and one that is more expensive to procure but cheaper to operate.

As your question implies, however, these "life cycle costs" considerations are frequently not dealt with in a coherent way when annual budgets are put together. It has been my experience that, since readiness is among the least visible of Defense expenditures, it is frequently the target of those who have to cut budgets in various parts of the budgetmaking process. Sometimes military services will submit budgets that are lower than they should be in the readiness accounts, in order to fund purchases of new weapons systems, in hopes that the readiness funds will be added by someone such as the Secretary of Defense, OMB, or the Congress further along in the process. Frequently in recent years, however, the military services' submitted budgets have provided for significant increases in the readiness accounts—although not always as large as one would hope—and the significant cuts in readiness have come about otherwise. For example, in budget drills during the fall, late in each annual budget preparation cycle, it is often the case that lower budget totals are levied on the Department of Defense than the budget target that had been given earlier in the year. Late in the process, unless one wants to terminate a major weapons program, there is frequently not enough money in any accounts other than the readiness accounts to accommodate these billions of dollars in last minute cuts. Most reforms to eliminate "fraud, waste, and abuse" in the Department of Defense take some time to implement—for example closing unnecessary military facilities—and they simply cannot be used for last-minute cuts in the fiscal year. Then, I am afraid, Congress has been a major contributor over the years to reductions in the readiness accounts. Congress cut the Defense budget every year from 1965 to 1980 (unlike the previous era, in which it cut some years and added in others); in many of those years Congress added purchases of major weapons systems to the Defense budget while still making its net reduction. Under these circumstances, the funds have almost always come out of readiness accounts.

I have no single simple solution to offer to this difficult problem. Adequate budgets will help. Avoidance of last-minute cuts will help. Willingness to cancel major weapons systems rather than to levy percentage cuts on the Department of Defense will help. Some more visibility might be given to these readiness cuts, and therefore enable readiness to compete more equally with other parts of the Defense budget, and other federal expenditures, if each weapon system were given a suitable "military readiness account" as you mention in your question. The big difficulty would be in allocating such important readiness items as fuel and ammunition that are used by a number of different weapons systems. To take just one example, cutting the fuel, and hence the steaming days, for the Navy has a negative readiness impact all across the fleet—it would be a difficult accounting job indeed to allocate the negative impact on fuel shortages weapon system by weapon system. The same would be true of such items as base operating support, although spare parts might lend themselves to such an accounting.

With respect to further information on how readiness reductions affect the day-to-day operations of our major weapons systems, I would refer you to "The Problem of Military Readiness" by Melvin R. Laird and Lawrence J. Korb (American Enterprise Institute, 1980). There is also a briefing that has been widely given to members of Congress by a member of the staff of the Office of the Secretary of Defense named Charles Spinney, which details readiness problems particularly with high technology systems—the briefing uses the F-15 aircraft as one of its major examples. Although I don't agree with all parts of this briefing—I believe, for example, that it comes close to sounding as if technology is the problem, not just needless complexity—it does have some useful insights about readiness.

[From the Washington Post, Apr. 14, 1980]

REAL, REAL GROWTH FOR DEFENSE

(By R. James Woolsey)

As the Congressional Dollar Hunt gets under way each spring, the contending traditional halloos of "Guns!" and "Butter!" come wafting down the Mall. Those who have seen the spectacle before—the dozens of subcommittees galloping across one another's paths, the spills into damp confusion, the staff hounds losing the scent, the thin, bedraggled quarry—may be forgiven if they wince and turn away to contemplate instead the cherry blossoms or the pick-up softball games. If they must try to catch the poor trembling little thing, isn't there a simpler way?

Probably not. But one problem contributing to the incoherence of the whole effort is that, regarding defense, almost the whole public budget debate is couched in terms of guns versus butter. The question of what the guns are for is relegated to a relatively minor role.

The guns and the people who carry them are, after all, for deterring the Soviets and their clients from war, or defeating them if it comes to that. Assessing what you need for defense is thus a fundamentally different kind of problem from that of financing NASA's trips to the moon or distributing food stamps. There is a rational player on the other side trying to make the job harder—trying to be absolutely sure that, if he feels he needs to, he can kill you.

Thus what the Soviets are doing about buying guns should at least be an item of more than secondary interest. The lack of attention to this at budget time in the press and in much of Congress is a habit of some years' duration, due in part to the Pentagon's having lost so much credibility in the Vietnam era that many people shy away from discussing "The Threat." It has connotations of scare tactics, beribboned briefers claiming superior knowledge and infallibility—all that. The revulsion against that era's excesses has carried over, for many, into years of reluctance to invest in and maintain our armed forces, a reluctance rationalized in various ways. As a result, our margin for error is gone.

From the mid-1960s to the early 1970s, we poured about a quarter of a trillion dollars in military resources into the Vietnam War. Most of what it bought is still there in the jungle, either rotting or being used gleefully by the Vietnamese in their gambols around Cambodia and elsewhere. But the Soviets, in the decade of the 1970s, spent on their military nearly a third of a trillion dollars *over and above* what we did. And they still have a great deal of what they bought with it.

Today the Soviets annually spend nearly $60 billion more on the military than we do—well more than double the percentage of GNP we spend—and their budget continues to grow at least 3 percent in real terms. (Those are the CIA's figures; academic critics and the Chinese government say Soviet military growth is double the CIA estimate.) Our growth would keep pace with Soviet growth—albeit from a position a long way in the rear—if it weren't for inflation. But the Soviet real growth in the military is *real* real growth. Ours isn't. Ours is calculated on the assumption that there will be an average of around 9 percent inflation for all of Defense next year.

Read the double-digit headlines, then pretend you are a Soviet military leader and try to repeat that 9 percent figure to yourself without chuckling merrily. When the Consumer Price Index goes up by 18 percent, the law requires that Social Security payments keep close pace. That's called zero real growth. When inflation is well up in the double digits but defense goes up 3 to 5 percent above a hokey 9 percent assumed inflation rate, that's called 3 to 5 percent real growth.

Assuming that inflation rate for defense, the United States will have "real" growth in defense at about the same rate as the Soviets next year—but only as long as you are willing to forget about all the weapons programs that are so under-costed that they have built-in cost-overruns waiting to be discovered; forget about fuel that is priced to assume no increases above today; and forget about sergeants whose pay raise is—yet again—half or less of the increase in prices for what their families have to buy.

Particularly because of this latter point, a U.S. defense budget at the currently proposed level, if inflation were accurately reflected, would show real decline, not real growth. The administration says military programs will not suffer because of inflation; but until the corrections are proposed, the *real* real question in the current debate is how well can we handle the Soviets militarily if we march backward while they're double-timing forward?

No, we shouldn't be trying to race the Soviets to the bankruptcy court. Yes, our allies make some contribution to the common defense—large in the aggregate, but not well coordinated—and they should make more. Yes, economists can differ about the exact amounts, in rubles or dollars: in rubles the Soviet lead is somewhat less (but its growth rate is higher). And, yes, it is outputs (real military capability) not inputs (dollars and rubles) that ultimately make the difference.

But different levels of military spending on the order of a third of a trillion dollars within a decade, together with diverging growth trends, produce widening gaps in capability that begins to affect our ability—and our will—to prevent the Soviets or their clients from doing things like dominating the Persian Gulf and Finlandizing Europe and Japan. That third of a trillion dollars' difference is one big reason why the Soviets have four times the tanks we have and are producing tanks, guns and aircraft at two to three times the rate we are; why they begin construction of a new general-purpose submarine about once every five weeks while we start one a year; and why they have 25 new divisions equipped for chemical warfare, some of which are playing an exhibition season against Afghan tribesmen. To expand the numbers slightly in an expression made famous by the late senator Everett Dirksen: a third of a trillion here, a third of a trillion there—before you know it, it adds up to real money.

In other words, at some point the standard debating points become merely interesting wavelets on the surface of the Soviet military flood tide. The Soviet military budget exceeds ours today by about the same percentage by which Germany's exceeded Britain's in 1935. It is not profitable to let the annual dollar hunt become a ritualized happening like the favorite well-worn argument an old married couple has at regular intervals. New facts—such as the Soviet buildup—ought to change the nature of the debate. As a fine young author put it 40 years ago, in his dissection of the hauntingly similar British defense budget debate in the 1930s, "Why

England Slept": "We should profit by the lesson of England and make our democracy work. We must make it work," John F. Kennedy wrote, "right now."

[From the Washington Post, Feb. 24, 1981]

FIDDLING WITH PROCUREMENT

(By R. James Woolsey)

What with the large budget cuts for domestic programs and the substantial increases for defense, the cry will soon be up for defense procurement reform. More competition will save money, right? And by the way, why does it take the Defense Department so god-awful much time to get weapons built and deployed? While you're at it, Cap, fix that too, will you?

The problem is, however, that an ideal method of defense procurement, rascal that it is, always seems to duck out of sight just as we come around the corner upon it. Say one secretary of defense tries to speed up a few programs, so the tanks won't be obsolete by the time they're deployed. But before you know it, something goes wrong—cost too high, the engines inhale sand—and everybody jumps on the poor gent for inadequate planning, foreshortened testing and insufficient competition. Clearly that guy didn't understand defense procurement.

So his successor sweeps clean, and decrees that there will always be a careful pace—no early procurement until all development is completed—and all kinds of testing to make sure eager-beaver program managers are not rushing into any problems. And while we're at it, the new secretary decides, we'll pay for several different companies to develop each weapon to encourage competition and really hold those defense contractors' feet to the fire before they get a big procurement contract. A few years later, enthusiasm for his reforms begins to wane as people begin to see that we have spent all our money on lots of competitive prototypes and elaborate tests, but the tanks and aircraft that are actually out with our troops are being handed down from father to son while the Soviets snicker and point from their shiny new turrets and cockpits.

Off with the secretary's head, and let's have some adequate planning around here, comes the cry. His successor is a manager, from the Harvard Business School by golly, and he tells us firmly that—instead of staging competitions among prototype weapons, which takes a lot of time and money—we'll do it all with paper. We'll have lots of review boards to grade and score industry's written proposals, and everybody will do scads of computer stimulations. While they're at it , Congress and OMB join in, they can all file Arms Control Impact Impact Statements, Mission Element Need Statements, Environmental Impact Statements and Impact Statements, and we'll get some rationality into this process. As the delays get worse and the costs go up, the nation turns its weary eyes to a new secretary of defense, who will take charge and speed up a few progams, so the tanks won't be obsolete by the time they're deployed . . .

A stylized tale, perhaps, but the point is that more messes have been created in defense procurement over the years by the ideologically fervent, trumpeting one or another universal reform and thus overcorrecting for the mistakes of their predecessors, than by any other members of the military-industrial-congressional ménage.

For example, a few years ago—in the name of bringing hard-nosed cost-conscious business management to shipbuilding—the civilians in the Office of the Secretary of Defense forced the Navy into a new way of buying ships, called "Total Package Procurement." Neglecting that they were dealing with a brand-new shipyard that was using extremely innovative modular building techniques and that was having predictable problems in finding an experienced labor force (in Pascagoula, Miss.), the procurement reformers got control of those stodgy old admirals and taught them a thing or two about management. The Navy, for the first time, was required to obtain a single firm fixed price for an entire class of dozens of ships whose construction would span many years.

Chaos ensued, for a number of reasons, but the rigidity of the reformers' dream contract both magnified the confusion and crippled the search for solutions for nearly a decade. The lesson, however, is not that one should never use such fixed-price contracts—just that that kind of fixed-price contract doesn't work for shipbuilding. Development and procurement techniques should vary enormously for different weapons and different states of the relevant technologies. Ecclesiastes, as usual, has it right—to all things there is a season: a time to run development and procurement concurrently, and a time to pause and test; a time to squeeze costs, and a time to push capabilities; a time to start fresh, and a time to modify what you already have.

There is no bright new idea that can substitute for putting able and experienced people in charge of weapons development and procurement, people who know the business and who have a feel for these nuances. Yes, oversee them from the White House and Congress the way any good board of directors would—make sure they are pursuing the nation's objectives, not those of the bureaucracies beneath them. Fire them if they foul up. But don't take up all of your time, and theirs, fiddling with the details of their jobs and trying to get them to treat the procurement of everything the same way.

Above all, keep in mind the only known statement about military procurement that is both brief and true—enunciated, remarkably enough, by a lawyer (addressing another subject): "Man was born to formulate general propositions," Holmes wrote, "and none of them was ever worth a damn."

[From the Washington Post, Apr. 28, 1981]

A STRATEGY OF FUDGING NUMBERS

(By R. James Woolsey)

The Reagan administration is beginning to lay some minefields in its own path toward a sensible and sustainable defense policy.

One such minefield bears a close resemblance to one that Jimmy Carter adroitly used to blow a foot off his own credibility: hokey inflation projections. The ideology behind Reagan's ridiculously low inflation forecasts for defense spending is different from Carter's, but the effect—a year or two hence—will be similarly crippling.

Jimmy Carter's pledge of 3 percent annual "real growth" in defense spending became the nominal target for each year's defense budget. But the twin desires to increase domestic spending and to hold down the overall federal budget deficit produced an irresistible incentive each year to squeeze defense more than that target would allow. The only way you could depress real defense growth below 3 percent and still, with a straight face, both claim to be meeting that target and press the NATO allies to do the same was to fudge on the projected inflation rates for defense.

If, say, you were sitting in the White House and you expected inflation in defense to be 10 percent, you would need a 13 percent increase to have 3 percent "real growth." But that, you grumbled to yourself, was a lot of money. So you hit upon the idea of blithely telling the Pentagon to plan for only 7 percent inflation, so you could budget for a 10 percent total increase and call that "3 percent real growth." That was the long slow curve.

The fast break came later in the same year when, with a sigh, you told the military that inflation in their programs had indeed turned out to be greater than you had expected, but that, sadly, there was no money available to make up for your regrettable mistake—they would just have to make do somehow. (These few percentage points meant billions of dollars. And because much of defense spending is effectively fixed rather early in the budget process—manpower costs, for example—the burden of this sort of back-door multi-billion dollar cut ended up hitting procurement and readiness very hard.) As the hapless uniformed military program managers were angrily summoned before congressional committees to explain the resulting cost overruns and to clarify why production lines were being cut back and initial operating dates of weapons delayed, you could even summon a little indignation: "Those people in the Pentagon have got to learn to plan and manage their programs better."

The Pentagon may, however, find it even harder to keep its eye on the Laffer curve than it did on Jimmy Carter's inflation-rate screwballs. The Reagan administration is now forecasting that, by the next presidential election, inflation in defense will be nearly 2 percent below what the Carter administration was predicting and 4 percent below the Congressional Budget Office's projections. The reason appears to be neither a desire to underfund defense nor a desire to make exaggerated real growth claims. Rather it is an effort to show faith in the efficacy of the president's overall economic program and a lack of willingness to admit any exceptions to this rosy inflation-free future—defense or any other.

Nonsense. Whatever happens to the economy as a whole, inflation in the defense sector is not going to come down that fast. Indeed, it is probably still heading up, at rates higher than even CBO projects, for a special set of reasons. The low levels of defense spending in the last several years have led many specialized subcontractors simply to quit the business of building components for, say, tanks and submarines. In the aerospace industry, orders by civilian airlines have also shrunk inventories for key structural and electronics components. Certain types of labor—machine tool operators, for instance—are in very short supply. These problems are several years away from solution, even amelioration, no matter what happens to the economy as a whole, and they will drive inflation in defense procurement for some time. Somebody had better level with Congress and the people about this soon.

The Reagan administration now has a golden opportunity in defense policy. For the first time since Vietnam, there is broad public and congressional support, among liberals as well as conservatives, for an adequate defense budget. Experienced defense supporters in Congress can finally turn the focus of their attention from obtaining adequate budgets to improving the effectiveness of defense spending. Sen. Sam Nunn (D-Ga.) has recently served such notice (the warning of "minefields" in defense inflation and outlay estimates is his metaphor). Some parts of the New Right are becoming intrigued by the possibilities offered by military reform. This opportunity to have many diverse rays of the political spectrum converge on a nonpartisan defense policy encompassing both innovation and adequate funding must not be lost.

One of the quickest ways to lose public confidence and destroy that opportunity is to continue to build into the budgeting system the automatic cost overruns and production cutbacks that have become so agonizingly familiar. And, whatever the rationale, the best way to create those melancholy phenomena is to serve up inflation estimates for defense that are even loonier than Jimmy Carter's.

Chairman ROTH. The committee is in recess.

[Whereupon, at 12:50 p.m., the committee adjourned subject to the call of the Chair.]

ACQUISITION PROCESS IN THE DEPARTMENT OF DEFENSE

THURSDAY, NOVEMBER 5, 1981

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, D.C.

The committee met at 9:02 a.m., in room 3302, Dirksen Senate Office Building, Hon. William V. Roth, Jr. (chairman of the committee), presiding.

Present: Senators Roth, Cohen, Rudman, Eagleton, Pryor, and Levin.

OPENING STATEMENT OF SENATOR ROTH

Chairman ROTH. The committee will be in order.

The committee meets today for the third of its series of hearings on the acquisition process in the Defense Department.

Today's hearing will focus on a particular procurement case, specifically, the incidents surrounding the efforts of the Julie Research Laboratories to gain a contract with the Army for the sale of automated calibration equipment.

I have an opening statement, but it is not my intent to read it in its entirety, but, without objection, we will include it as part of the record.

I do, however, want to make a few comments about these hearings and their significance.

First of all, I want to point out that these hearings are not intended to be an indictment of this administration or the new management of the Army. I applaud the fact that Jack Marsh, the Secretary of the Army, has instructed the IG to have a thorough no-holds-barred investigation. Neither is this intended to be a partisan attack.

I would point out that the problems in this area date back to 1974, nearly 7 to 8 years ago during the period where the management of the Pentagon was in the hands of both Republican and Democratic administrations.

We have received a copy of the summary of the findings of the Army IG, and I think it is very interesting and I congratulate them for their frankness.

The Army IG points out that Julie Research Lab did not get fair treatment by the Army. This small, inventor-led firm was not given full opportunity to compete on an equal footing with other suppliers and the principal reason for that appears to be that Mr. Julie was too aggressive, too forceful in his marketing techniques.

As I said, I congratulate the candor of the Army IG, but I must confess that I am deeply disturbed and deeply concerned with these findings.

It would appear that one cannot do business in some Army procurements unless one is part of the "old-boy network." Mr. Julie was trying to sell a better mousetrap but instead it was Mr. Julie that got it in the neck.

I would point out that the failure to procure from anyone because of their marketing technique, whatever it may be, is a violation and infraction of the procurement code. Aggressiveness has nothing to do with whether or not a piece of equipment should be purchased. The responsibility of the procurement official is to buy the best equipment for military needs at the lowest price. Based on the findings of the IG, it seems to me that there is a need of a shakeup in the procurement practices of those responsible for procurement in the calibration area.

It is not only the particular case that is disturbing, but it is the broader implications that worry me. After looking at the file and reading the background material I found that today, 7 or 8 years after the National Bureau of Standards and others have recommended that the Army and the military services do something in the area of calibration, that the Army's calibration program is still in total disarray. It is in total disarray because no one knows what the workload or needs are.

Even now in the current year, the Army is sending people to Europe to find out what the status of the calibration program is overseas.

I am concerned that despite the fact that there were a number of reports, internal recommendations, and despite the fact that there were people in the private sector that recommended the Julie equipment, Julie Research Labs nevertheless got the short end of the stick. And I'd like to point out that what we are talking about is extraordinarily important in the general context of these hearings.

Our concern here in the Governmental Affairs Committee is to insure that the procurement dollar is well spent. One of the facts that has become clear is that maintenance costs are a major component of ballooning defense costs. As I understand it, accurate fast calibration means good maintenance. Good maintenance means better operating equipment, with fewer equipment or weapons failure.

I would just point out that in the event of war, equipment failure or lost accuracy means loss of lives, so we are not only talking about saving dollars, but we are talking about saving lives and for that reason I think the calibration program deserves high priority. Instead of stonewalling Mr. Julie and others who are trying to provide good equipment, the Army itself should be aggressively seeking innovative new technology to do its job better at less cost.

Incidentally, it is my understanding that the Soviets saw the advantages of Mr. Julie's equipment and even tried to buy it, but he turned them down.

The final point I would like to make is that based on the IG findings, if this small businessman had this difficulty, how many other small business people have had the same problems?

If Mr. Julie had not been aggressive, maybe none of us would have known about this problem. How many other small businessmen have kept quiet in the hopes that that was a better way of doing business with Government?

I would, in conclusion, say again, it shall be the practice of this committee not only to hold hearings but to follow through. What we are going to be interested in is what the Army does to correct the situation with procurement.

I am not saying, nor would I say, that the Army has any obligation to purchase any equipment from any supplier, but I do say that all qualified suppliers are entitled to equal opportunity. We will be interested in following through as to what has happened.

[The prepared statement of Senator Roth follows:]

Prepared Statement of Senator William V. Roth, Jr.

The Committee meets today for the third in its series of hearings on the acquisition process in the Department of Defense. Today's hearing will focus on a particularly outrageous example of bungling, waste and mismanagement in the procurement process—the efforts of Julie Research Laboratories of New York to gain a contract with the U.S. Army for the sale of automated calibration equipment.

To most Americans, calibrators are probably as familiar as 20-dollar gold pieces. But these measuring devices are crucial to maintaining the readiness of our nation's defensive weaponry and hardware. Without proper calibration, we can't tell if our missiles will fly properly, if our artillery will fire accurately, or if the navigational equipment on our planes will operate effectively. Like a pebble thrown into a pond, a small error in the accuracy of calibration systems can have ripple effects throughout our network of defense equipment, with potentially grave effects.

Back in 1974, Mr. Loebe Julie, President of Julie Research Laboratories, first bid on a contract for U.S. Army calibration equipment. In the seven years since that time, Mr. Julie has fought a valiant and, until now at least, losing battle with the Army bureaucracy to prove that his automated equipment will perform many of the Army's calibrations faster, more cheaply and more accurately than the equipment which the Army is now using. Mr. Julie has used every attention-getting device he could think of, including illustrated booklets distributed to Members of Congress, the Executive Branch and the press, to call attention to his grievances. Several months ago, Army Secretary John Marsh ordered the Army's Inspector General to conduct a thorough, no-holds-barred investigation of this case, and a summary of the IG's findings is being released this morning.

The IG report makes three key findings:

Mr. Julie was not afforded a full and fair opportunity to compete on an equal footing with other suppliers of calibration equipment.

The principal reason for this was that Mr. Julie was too aggressive in his marketing techniques to suit the taste of Army procurement officials.

Some Army officials made statements in this case which were inaccurate, unproven, inconsistent, or open to misinterpretation.

In short, this is one of the most blatant cases I have seen of the "old-boy network" operating to freeze out a legitimate, innovative small businessman from competition for government contracts. In essence, what happened was that Mr. Julie tried to sell the Army a better mousetrap, but instead it was Mr. Julie who got it in the neck.

Mr. Julie's efforts over the last seven years to convince the Army that his calibration equipment was better than that of his competitors ran smack into a stone wall at every turn. He offered to put his machine up against all comers in a fair and even test, but he quickly learned that you don't win with the Army by finishing first. In fact, you can't even win by proving your endurance. Despite all of his efforts, Mr. Julie was unable to get the Army to seriously consider his equipment to see if it could live up to his claims. Despite glowing reports from commercial users of his machine; despite favorable tests reported by its own engineers; despite numerous requests from Congress for an impartial review, it now seems clear that the Army refused to give Mr. Julie a fair chance to prove his calibrator can do what he says it can do. Why? Apparently because the contracting officials took offense at Mr. Julie's marketing techniques.

I know of nowhere in the Army Procurement Manual where it is stated that aggressiveness shall disqualify a potential contractor from consideration. The Army is supposed to be buying the best equipment at the best price. I find it difficult to understand how Army officials could allow themselves to become so upset with Mr. Julie's high-pressure salesmanship that they allowed their personal feelings to interfere with their professional judgment. I hope the Army has come here today fully prepared to explain what actions they will take to remedy the mistakes revealed in this IG report.

But the Loebe Julie case raises many broader questions apart from the trials and tribulations of one unfortunate businessman. First, it appears from what we have learned about this case that the Army calibration program is in total disarray. There seems to be a serious lack of information within the Army as to its real calibration needs, or where calibration technology is headed. Why is it that after all this time, there are still no figures, no cold, hard data, on Army calibration workload requirements? Why has equipment been purchased on the basis of concept studies, instead of facts and figures? Why was it not until last September, after Mr. Julie had published his booklets and come to the attention of Congress, that the Army finally sent an inspection team to Europe to try to determine the condition of the calibration program there? According to the the IG report on the Julie case, it appears that there are too many people working at cross purposes in the procurement of calibration equipment. Procedures and regulations are not being followed; there is no central office responsible for determining overall requirements; few if any management tools are being used to maintain control over the procurement of this equipment.

It's important to keep in mind that we're not just talking about big bucks in this case—we're talking about the readiness of our military equipment and ultimately, the lives of our soldiers. Maintenance costs are a major factor in the ballooning defense costs of recent years, and these costs, along with the manpower requirements involved in maintenance, could be substantially reduced by good, fast, accurate calibration—calibration that would mean better operating equipment and fewer casualties in time of combat. Instead of stonewalling Mr. Julie and refusing to check out his equipment, the Army should be out aggressively seeking innovative new technology to do its job better at less cost. Mr. Julie came along and offered the Army a chance to do its job better and save money, and the Army blew it.

Second, the Julie case raises a number of questions about procurement practices within DOD generally. I wonder, for example, how many other small businesses have had similar experiences in trying to break into the "old-boy network," but didn't have Mr. Julie's knack for bringing their problems to the attention of the public. What about the Air Force and the Navy? Are these same kinds of problems occurring in the other services?

The Julie case seems symptomatic of what I regard as the central problem in DOD procurement—excessive reliance on sole-source procurements. Despite laws requiring competition in government procurement, competition in defense contracting dropped eight percent between 1972 and 1978. Today nearly 70 percent of all DOD procurement is non-competitive. Sole-source procurement is supposed to be the exception, but the exception is now becoming the rule. To my mind, the best thing we can do to cut down on the cost overruns and waste in the DOD procurement process is to reverse those trends and begin to inject a healthy dose of competition into defense procurement.

As I mentioned earlier in this series of hearings, there is now a national consensus for improving our defense capabilities, and I share in that consensus. But it is a fragile consensus, and to keep it intact, the Defense Department is going to have to prove that it is doing everything it can to control waste in our defense programs. If the Pentagon is really interested in saving money, it should carefully monitor contracts, avoid sole-source contracting whenever possible, and make the best, most cost-effective purchases it possibly can. In the Loebe Julie case, it appears that competition lost out to confrontation, and common sense to a clash of personalities.

I hope the IG report and this hearing will contribute to the establishment of a more effective procurement process. We cannot afford to throw away defense dollars on procurement actions riddled with errors in judgment. I expect to hear from the Army today how it will deal with the JRL case, and how it plans to insure that Mr. Julie is given an opportunity to prove his equipment. I expect to be told who was responsible for the major mistakes in the Julie case, and how they will be dealt with. Finally, I expect to learn how the Army plans to overhaul its calibration program to make it cost-effective, better coordinated, and fair to all companies who wish to offer their equipment to the Army. I don't want to hear that the Army is making an assessment of what needs to be done. I want to know what will be done. The Committee will be calling the Army back within six months to see what progress has been made in insuring that this kind of outrageous story is not repeated.

Chairman ROTH. I will be happy to call on my colleague, Senator Eagleton.

OPENING STATEMENT OF SENATOR EAGLETON

Senator EAGLETON. Thank you, Mr. Chairman. I am delighted to have the opportunity today to participate in the committee hearing and I will keep my remarks to modest length.

In the first two hearings of this series—and I take it that we will complete the series today—the committee focused on the institutional problems in the Department of Defense acquisition process. This morning's hearing will offer the committee an opportunity to hear from one defense contractor—namely, Julie Research Lab—about the problems that confront those who seek to break through the barriers that an inadequate procurement bureaucracy has unwittingly erected. It is an unfortunate fact of Capitol Hill life that the growing number of time-sensitive and time-consuming issues that crowd the congressional calendar make it difficult, perhaps even impossible, for members to adequately consider every nuance of the proposals put before them.

While some may argue that the matter of procuring calibration equipment is an insignificant portion of the total Pentagon procurement program, today's case study leaves me with the unsettling conclusion that if this can happen on such a small scale, what is to preclude it from occurring on even a grander scale?

Mr. Chairman, I would hate to think that while the Senate debates the merits of some new and exotic weapons systems on the Senate floor, there is some defense contractor with a more cost-effective alternative wailing in the cold with a voice that goes unheard. The message of the Julie Laboratory is that this does, indeed, happen. Like the chairman, I too have reviewed some of the documentation which was submitted in advance of this hearing, and while it is obvious that there are different views on this matter, and we will hear those views today, there does appear to be a general consensus that Julie Labs did develop a product at least comparable in quality to the one acquired by the Army that can be purchased with a substantial cost saving.

The question that begs to be answered, then, is why, after almost a decade of trying, has Julie Labs been unable to adequately make its case to Pentagon officials? It is that question and others that I hope will be answered by reason of today's hearing.

Thank you, Mr. Chairman.

Chairman ROTH. Thank you. Senator Cohen?

OPENING STATEMENT OF SENATOR COHEN

Senator COHEN. I would first like to associate myself with the remarks you made. I would also like my prepared statement submitted for the record and perhaps offer a couple of observations.

We have had two prior hearings, as Senator Eagleton has mentioned. The focus of those hearings has been on the overall problem with our procurement practices. This particular case was selected because it appears to illustrate several generic problems that were discussed during those two previous hearings.

I would like to emphasize, Mr. Chairman, that I don't think Congress ought to attempt to substitute its judgment for that of an informed and qualified contracting officer. We shouldn't dictate to the Army or any other agency which individual or which firm should receive Federal contracts.

Our role is to oversee the procurement process and to insure that Federal agencies play by the rules and follow the laws that we have drafted. To the extent procurement regulations are not being observed and contractors are being unfairly excluded from receiving Government business, then Congress has an obligation to examine the charges. That is what we are doing today.

I think an even more critical duty of Congress is to oversee the readiness of our troops and their equipment, including calibration devices which guarantee that vital equipment is tested accurately.

Mr. Julie has made some very serious charges that the Army is using inferior calibration equipment to the detriment of its readiness. We are going to look closely into Mr. Julie's allegations during the course of this hearing.

I would simply like to say that the test for contracts for the Government should be performance and not personality. When we have a serious illness or a sickness, we seek out a doctor not because of his personality, but because of his skill. It is not enough that a doctor has a good bedside manner if he has the hands of a plumber instead of a surgeon. It seems to me that the analogy is well worth taking into account. When we have serious deficiencies in our readiness or in our capability of firing our weapons systems accurately, what we should be seeking out is the best possible contractor. And the best possible contractor does not necessarily have to be part of the "old-boy network," but rather, he should simply have the better product.

So I look forward to the hearings, Mr. Chairman. I do not think this is an isolated case. I think we could come up with hundreds of similar cases and I suggest Senator Rudman will speculate perhaps thousands of similar cases. So I look forward to developing the facts in this case.

[The prepared statement of Senator Cohen follows:]

PREPARED STATEMENT OF SENATOR WILLIAM S. COHEN

Mr. Chairman, I would like to comment briefly on some of the issues that will be raised today.

From the outset, I think that it is important for our witnesses, as well as for our observers, to understand our purpose in holding a hearing on this well-publicized, seven-year dispute between a private contractor and the Department of the Army.

This Committee has, for a number of months, been reviewing the procurement practices and problems of the Department of Defense. Two days of general hearings featuring a wide range of defense experts have preceded this hearing which will focus on a specific case study. This case was chosen because it appears to illustrate several generic procurement problems that were discussed in general terms at our previous hearings.

Let me emphasize that I do not believe that Congress should attempt to substitute its judgment for that of an informed and qualified contracting official. We should not dictate to the Army or any other agency which individual or which firm should receive federal contracts. Congress should, however, oversee the procurement process and ensure that federal agencies play by the rules and follow the laws that we have drafted. To the extent that procurement regulations are not being observed and contractors are being unfairly excluded from receiving government business, Congress has an obligation to examine the charges. And that is what we are doing today.

An even more critical duty of Congress is to oversee the readiness of our troops and their equipment—including the calibration devices which guarantee that vital equipment is tested accurately. Mr. Julie has charged that the Army is using inferior equipment to the detriment of its readiness. This extremely serious allegation will be discussed today.

I have not prejudged the countless charges and countercharges that have been made, and I approach this hearing with a completely open mind. The question that, in my judgment, should be fully explored at this hearing is this: has the Army without justification excluded a contractor from the procurement process and, in so doing, bought less accurate and more costly calibration equipment?

I do not yet know the answer to that question, but I look forward to raising this issue with our witnesses.

Thank you, Mr. Chairman.

Chairman ROTH. Senator Rudman?

OPENING STATEMENT OF SENATOR RUDMAN

Senator RUDMAN. Thank you very much, Mr. Chairman. I join in your remarks and those of Senator Eagleton and Senator Cohen.

Let me just say very briefly that a close reading of this entire record, this very sorry record, indicates to me that contrary to the biblical story that when David fights Goliath, David usually gets killed. We have a situation here with this company where the institutional responsibility of the Army was replaced by personal prejudices against a man whose only sin, in my view, was trying to aggressively market a technologically superior product. If this is symptomatic of Army procurement policies, and I hope it is not, but if it is, the taxpayers of this country are owed an explanation.

In this particular case, the record is replete with stonewalling, obfuscation, and I believe, the passing on of falsehoods from subordinates to superiors who admittedly are too busy to do any in-depth evaluation themselves. If these hearings do nothing else, they are to tell the Army and all of the Services that if these kinds of procurement policies continue, the support for military spending that comes from many in the Senate and the House, such as myself, will come to a screeching halt.

Thank you, Mr. Chairman.

Chairman ROTH. Thank you.

Senator Pryor?

OPENING STATEMENT OF SENATOR PRYOR

Senator PRYOR. Thank you, Mr. Chairman.

I appreciate once again your calling these hearings. This is the third, I believe, in a series of hearings on the Department of Defense acquisition processes. It is totally mind boggling, I might say, as one member of this committee, to attempt to unravel the complexities and mysteries inside the Department of Defense in trying to find out how the Defense Department finally makes its decisions.

For example, in the case today, when we look at one particular entrepreneur, Julie Laboratories, the Department of Defense tells us constantly that more suppliers should be encouraged to enter defense business, to assure the Nation a strong competitive production base. But in the case of this particular company, which manufactures calibration equipment, it seems that the Army has discouraged an aggressive and eager firm from entering a segment of the defense market sorely in need of additional suppliers.

Also, DOD tells us constantly that increased emphasis must be placed on free and open price competition. However, last year some $30 billion was spent by DOD without one competitive bid whatsoever. And in the case of Julie Labs, it appears that the Army has failed once again to provide a potential new supplier with a full and impartial opportunity to compete.

Additionally, DOD tells us that its acquisition process is too centralized today and the greater decisionmaking authority and responsibility must be delegated to the individual Services, but in the case of Julie Labs, it appears that Army procurement officials failed to uphold regulations that were already on the statute books.

I think, in short, Mr. Chairman, the gap between DOD's promise and its performance seems to be very wide, indeed. There is a tremendous gap. The taxpayer is going to continue to bear this cost of waste and mismanagement and our legitimate defense needs are going to suffer. We keep trying to spend additional billions of dollars at DOD to basically create the illusion of strength.

At the same time, the Department of Defense attempts to create the illusion of fairness and equity in the procurement process. Today Mr. Julie and his business will attest, I think, that fairness and equity does not prevail.

My basic question is, how many more Julie Labs are there out there in the country? How many more hundreds or possibly thousands of small business people, creative entrepreneurs who want to get into this business, who want to compete, who want to have the opportunity to compete? How many more Mr. Julies are there out there in this country that have been foreclosed from participating in this process? I think that, today, that may be one of our central questions.

Thank you, Mr. Chairman.

[Senator Pryor's prepared statement follows:]

PREPARED STATEMENT OF SENATOR DAVID PRYOR

Mr. Chairman, these hearings have brought to light several ways to make the defense acquisition process more efficient and cost-effective. Such means include greater competition in defense purchases, a revitalized defense production base, streamlined decisionmaking procedures, greater stability in defense procurement, and more realistic cost estimation procedures. The Department of Defense recognizes the need for improvements in these areas and is implementing several initiatives to strengthen its acquisition process.

We address today the case of Julie Research Laboratories, Inc., a small entrepreneurial firm that has sought unsuccessfully to compete for Army contracts for calibration equipment. It is an intriguing case because it suggests there is a wide gap between what the Department of Defense tells us it must do to ensure efficient and effective procurement—and what it is actually doing in the everyday procurement world.

For example:

DOD tells us that more suppliers must be encouraged to enter defense business to assure the nation a strong, competitive defense production base. But in the case of Julie Labs and calibration equipment, it seems that the Army has actually discouraged an aggressive and eager firm from entering a segment of the defense market sorely in need of additional suppliers.

DOD tells us that increased emphasis must be placed on free and open price competition. But in the case of Julie Labs, it appears that the Army has failed to provide a potential new supplier with a full and impartial opportunity to compete and has relied unjustifiably on sole-source contracts for acquiring calibration equipment.

DOD tells us that its acquisition process is too centralized and that greater decisionmaking authority and responsibility must be delegated to the individual services. But in the case of Julie Labs, it appears that Army procurement officials failed to uphold regulations that are already on the books.

How can DOD delegate additional responsibility, or successfully implement its new defense acquisition initiatives, when it cannot rely on Service officials to fully implement existing regulations?

In short, Mr. Chairman, the gap between DOD's promise and performance seems wide indeed. Unless this gap is closed, the taxpayer will continue to bear the cost of waste and mismanagement, and our legitimate defense needs will suffer.

Chairman ROTH. Thank you. We will now call forth our first witness.

Before I call upon Mr. D'Amato and Mr. Weiss to introduce them, I would ask, if you could, to keep your introductions as concise as possible because we do have a number of witnesses that we have to proceed with this morning. As is our practice in this kind of a case, we will require all witnesses to be sworn, I would ask Mr. Julie, and Mr. Wager, if they would please stand and raise their right hands.

Do you solemnly swear to tell the truth, the whole truth, and nothing but the truth, so help you God?

Mr. JULIE. I do.

Mr. WAGER. I do.

Chairman ROTH. Thank you. Please be seated.

Senator D'Amato, it is a pleasure to have you here this morning.

We appreciate your coming here, Mr. Weiss. So would you two please proceed?

Mr. D'Amato?

TESTIMONY OF HON. ALFONSE M. D'AMATO, U.S. SENATOR FROM THE STATE OF NEW YORK

Senator D'AMATO. Thank you very much, Mr. Chairman.

I come before you this morning to introduce you to Mr. Loebe Julie, a constituent of mine, someone my office and I have come to know. We have had an opportunity to review this matter.

Mr. Julie calls it a mugging by the procurement bureaucrats of the U.S. Army. Mr. Julie is the son of a Polish immigrant family, a native of the Bronx. His career could be a modern Horatio Alger story. He started his own small business, using $19,000 in family savings. His business, Julie Research Laboratories, manufactures advanced technology calibration equipment based on his own patents. Experts will appear before you to testify to the quality and technical merits of his products.

The Army's bureaucrats have pushed this firm to the edge of financial disaster through conduct which represents at least misfeasance in office, if not malfeasance.

I won't attempt to give you a blow-by-blow account. I will, however, point out that Mr. Julie has sought justice by following the established procedures designed to prevent these abuses and the system has blocked and defeated him at every turn.

Finally, after 6 years, he decided to go public with his now famous comic books. I think it is a shame that the man had to go to those kinds of lengths to attract the high-level attention that ultimately produced today's hearings. He had to come to Congress, not the Army, to get action, and only after congressional interest was aroused did the Army bureaucracy begin to respond.

Mr. Chairman, I ask that the balance of my remarks be included in the record as if read in their entirety.

Chairman ROTH. Your entire statement will be included in the record at the conclusion of your testimony.

Senator D'AMATO. But I would just like to point out several things. It appears to me and to my staff and to the people I have reviewed this matter with very, very closely, that what we have is a situation of a circle-of-wagons mentality. Let's not, after all, rock the boat. So and so is a good man, he has done a good job. No one is interested in who is responsible. The question is when we get to the bottom of this, will there be some definitive action in the Julie case or are we going to get another study, as outlined by the Secretary's report, page 13, paragraph 4:

> The Army plans to conduct an intensive review of these matters and indeed to produce as a result of this review an implementation plan for the indicated changes. The review and plan are due to be presented to me on March 15, 1982.

Well, that may be good in terms of correcting the total situation and its problems, but it is not good enough for Mr. Julie because he does face financial catastrophe and closing down and our Nation may never be able to see whether or not his product does do what is intended.

I think that kind of delay is the favorite technique used by the bureaucrats—and fear and intimidation. In the short time I have been in the Senate of the United States, this has not been the first time that I have had occasion to see this with the Army, with the Army procurement officers, a high-handed dictatorial group, which decides you do it our way and if you question us, boys, we will get you, and we will get you later and you better keep quiet.

Senior officials in New York were calling me and saying to me, "Senator, please don't say anything because they will make our life miserable. We have other contracts out and pending and they can just destroy us." That's nonsense. I want to tell you, if that is the kind of attitude that continues, I echo Senator Rudman's statement. I am on the Appropriations Committee and I am not just going to appropriate willy-nilly until we see some definitive action, and I commend the chairman and your committee for setting about a most important task, seeing to it the American taxpayers' dollars are well spent and, indeed, that the entrepreneur who comes from a small business isn't blocked out and isn't stymied by the "old-boy" mentality that does indeed exist, the buddy system.

I hope that your committee's work will result in more than correcting an inequity with respect to Mr. Julie and I commend you for undertaking this task.

[The prepared statement of Senator D'Amato follows:]

PREPARED STATEMENT OF SENATOR ALFONSE D'AMATO

Mr. Chairman, I come before you this morning to introduce to you Mr. Loebe Julie, a constituent of mine. He is the victim of what he calls a business "mugging" by the procurement bureaucrats of the U.S. Army. The son of a Polish immigrant family, and a native of the Bronx, his career could be a modern Horatio Alger story.

He became an engineer and inventor, and started his own small business using $19,000 in family savings. His business, Julie Research Laboratories, Inc., manufactures advanced technology calibration equipment based on his own patents. Experts will appear before you today to testify to the quality and technical merit of his products. Yet, the Army's bureaucrats have pushed his firm to the edge of financial disaster through conduct which represents at least misfeasance in office, if not malfeasance.

I won't attempt to give you a blow-by-blow account of the "mugging". I will, however, point out that Mr. Julie has sought justice by following established procedures designed to prevent abuses of the procurement process. Yet, the system has blocked him and defeated him at every turn.

Finally, after 6 years, he decided to "go public" with his problem. He produced these two now famous "comic books"—which attracted the high level attention which ultimately produced today's hearing. He had to come to Congress, not the Army, to get action. Only after congressional interest was aroused, and after the change in leadership in the Department of the Army which followed the election, did the Army bureaucracy begin to respond to the problem.

We must be concerned about this failure of the safeguards established to protect the integrity of our defense procurement process. If we are to regain the "margin of safety" we must have in order to preserve the peace, we must make sure that we get a dollar's worth of defense for every dollar we spend on defense. This situation is an excellent example of a case in which we have failed to do that.

While I am confident that my colleagues on this committee will fully explore the facts of this situation, I want to highlight two of my concerns.

First, in situations where waste and abuse are alleged, the key question is: "who was responsible?" One of the best ways to discourage bureaucratic excesses is to find the responsible individual or individuals and make them accept responsibility for their errors or misdeeds.

The Inspector General was unable to substantiate the existence of a "deliberately malicious campaign" against Julie Research Laboratories on the part of Army officials. But there is ample evidence to conclude that preconceptions, bias, and the bureaucrat's favorite weapon, delay, adversely affected Julie time and again. Will the responsible officials continue to receive their promotions and incentive bonuses for "superior performance", or will they be held accountable for this mess?

My second concern goes hand-in-hand with my previous point:

"What is being done to correct the problem so it doesn't happen again?" Under Secretary of the Army Ambrose, who is scheduled to appear before you today, should be able to provide an answer to that question.

Here, I want to commend the performance of the Army Inspector General's team, which, under the leadership of Maj. Gen. Robert Solomon, conducted the investigation which has clarified many aspects of this situation. Their work, along with that of the earlier team of General Accounting Office investigators, proves that the system's internal controls haven't all failed. Objective self-examination and self-correction is possible when people of integrity are allowed to do their duty.

I am concerned about the "circle-the-wagons" mentality I encountered in the Army regarding the Julie Research Labs case. Some officials who were not involved in the procurement of calibration equipment or management of the calibration program decided that their highest priority was to "protect their own", instead of discovering the truth about Julie's allegations and taking swift corrective action against waste and abuse. While that attitude is understandable in light of attacks on the military in recent years, it is not acceptable.

A former Secretary of the Army, Bo Callaway, started a program using the phrase "glad you asked" to set the correct tone for the Army's responses to public inquiries. Well, in this case, the Army was certainly not glad that my colleagues and I asked them about Mr. Julie's problems. The Army's initial responses were neither forthcoming nor helpful.

Perhaps we need to reinstate Secretary Callaway's program at the Department of the Army.

Secretary Marsh, Under Secretary Ambrose, and General Solomon have been responsible for initiating and conducting the investigation which provides us and the Army with the facts necessary to correct the situation. Working together, we can eliminate the waste and abuse which are a serious threat to our defense programs.

Finally, let me say that regardless of what is done here today, the Army's "mugging" of Julie Research Labs may well have turned into business "murder". As a matter of fact, Julie Research Labs may be on the verge of going out of business, largely as a result of its mistreatment at the hands of the Army's procurement bureaucracy. As a result, we may never learn whether Julie's equipment could produce the cost savings he claims, and he may never have the opportunity to enjoy the benefits to this Nation's defenses which the purchase of Julie's equipment could provide. Thus, further study and evaluation of the situation could make the results of this hearing moot.

Loebe Julie has come to Congress asking for justice. He has persisted in his quest for vindication in the face of defeat after defeat. His great courage and dauntless determination should not be rewarded with the destruction of his life's work. While this committee does not have the power to save him, I believe this Government has an obligation to "make him whole", and must not wait for a sterile judicial determination of fault and damages.

We must protect and encourage our innovative, high technology small businesses. In order to have a strong national defense, we must have a strong defense industrial base. People like Loebe Julie are the foundation upon which this Nation's economic and military future are built. His roar of outrage must be heard and heeded, or our future may be bleak indeed.

Thank you, Mr. Chairman.

Chairman ROTH. Mr. Weiss, do you have any remarks?

TESTIMONY OF HON. THEODORE S. WEISS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW YORK

Representative WEISS. Thank you very much, Mr. Chairman.

I do want to commend you and your colleagues for undertaking these hearings and addressing the problems that Mr. Julie, who is a constituent of mine, has had with the Department of Defense for all these many years.

All of us have in one way or another touched on Mr. Julie's personality. I haven't known Mr. Julie prior to about 1½ years ago when he first walked into my office. So I have no way of knowing what his personality was before he got involved in this kind of situation with the Department of Defense. But there is an old saying, that if they are really after you, it is not paranoia. And I have to believe on the basis of the information I got in following this thing for the last 1½ years, that, in fact, the Department of Defense is out to get him. I think there is a calculated plan to drive this man out of business so that they won't have to be bothered with either his competition or his personality, and I don't know which bothers them the most.

I would like to ask permission to have my full statement entered into the record.

Chairman ROTH. Your complete statement will follow your testimony.

Representative WEISS. In passing, I simply want to express my appreciation to the Secretary of the Army.

Mr. Marsh, I think, has been determined and diligent to get to the bottom of this. Unhappily, like most of us, he is surrounded by a lot of people whose commitments may not be as strong as his. Mr. D'Amato alluded to a new Army study that would delay this thing for decision until March. Julie's company would have been long gone and buried by that time, and that is exactly what those people have in mind.

I should tell you that Mr. Julie probably has the only defense manufacturing plant in my district. So his survival means a great deal to me and to my district, but I think, more importantly, to the Nation itself.

I thank you very, very much for the courtesy of letting me address you this morning.

[The prepared statement of Congressman Weiss follows:]

PREPARED STATEMENT OF CONGRESSMAN TED WEISS

Mr. Chairman and members of the committee. Thank you for this opportunity to testify today about my constituent, Loebe Julie, and his attempt to correct a very hazardous and expensive pattern of Army procurement. As you know, calibrations is an obscure but vital function that is central to the defense of the United States. Mistakes in this area not only jeopardize our security, however. Mistakes of the kind the Army has made have wasted millions of taxpayers' dollars at a time when we cannot afford to waste a dime.

The issue here is the Army's refusal even to consider buying Mr. Julie's equipment, automated machinery that is more accurate, far easier to use, and less expensive than the manual equipment they continue to buy. The Julie equipment would save at least $120 million over 10 years, improve what may be dangerous levels of calibrations quality, and move Army calibrations into the modern age of automation.

Yet Loebe Julie is about to go out of business, as a result of what I can only describe as a conscious, even calculated Army effort to deny him contracts he should have won. His loss would be devastating: Only one manufacturer of AC and DC low-frequency calibrations equipment would remain. Dependence on just one major source of this machinery would clearly harm our national security. And the inventors of this equipment—Mr. Julie and his engineers—would be out in the street, a sad commentary on our treatment of talent.

I first met Loebe Julie in July of last year. From the time I met him until today, I have asked the Army to do two things: to investigate its calibrations procurements and their overall impact, and to change its contracting pattern. I can report some progress on the first front, but in the second area, Army behavior has not changed.

Let me cover the more positive area first. This year, Army Secretary John Marsh has taken a personal interest in the case, after inquiries by myself and a bipartisan group from both Houses of Congress. The Secreatry ordered an investigation by the Army's Inspector General, which is finally nearing its conculsion. A digest of its findings will be presented today. I have spoken to Secretary Marsh about this case, and believe the IG's report will reflect his determination to find the answers.

The second area is more discouraging, and I hope it is not a harbinger for the future. It is well and good for the Army to investigate. Yet all the investigating in the world will accomplish nothing if the Army's behavior does not change.

I have been distressed that on the three occasions when I have asked the Army to suspend a procurement, they have promptly dismissed that notion. The Army has refused to wait for the outcome of Mr. Julie's formal protests, and claimed that the need for the equipment in each case was too urgent to wait. I remain very concerned, however, that we will find that these procurements were wasteful and misdirected, and that the failure to suspend them has allowed large sums to be spent that cannot be recovered.

The most recent example of Army failure to change its behavior is a contract awarded to Ridge Instruments of Huntsville, Alabama, for 52 AC calibrators.

Ridge Instruments is a small business that buys calibrations equipment from large concerns and, in turn, sells it to the Army. Ridge makes only minor modifications to the equipment, made in this case (and in another contract for which Mr. Julie bid) by the John Fluke Co., located in the State of Washington (the only other true manufacturer).

But to qualify for the contract, a business must be both a small business and a manufacturer of the item being purchased. Under Federal regulations, a business can qualify as a manufacturer if it doesn't actually manufacture the product it sells to the Government. But it must make a "significant contribution" to the final product, according to GAO rulings, and the Code of Federal Regulations notes that "mere packaging" is not sufficient (41 CFR 50-206.52).

Ridge's modifications to the calibrators under the latest contract are very, very minor. They remove two handles; add a piece to help slide the machine into a rack; move an instruction label from one side of the machine to the other, and saw off part of a protruding exhaust cover. I can see no way these modifications constitute a "significant contribution"; in fact, I think it is ludicrous to suggest that. Yet I am willing to wait for the outcome of Mr. Julie's protest to the Small Business Administration. The Army, however, was not willing to wait.

I will not bore you with the details of my efforts on Loebe Julie's behalf. I will say that 1981 has been an improvement over 1980 because Army representatives, including the Secretary, have met with Mr. Julie and shown an interest in his case that was not apparent last year. I would also like to suggest a few areas for you to explore in questioning Army witnesses today (see "Appendix" to this statement).

I believe that you will find Mr. Julie's case to be a persuasive example or irrational, capricious and wasteful purchasing policy. It is a case that shows one way small businesses are being crowded out of defense procurement. It is a case where the Army has chosen not to correct mistakes, but to continue on its wayward course. It is a good example of how things must not be done in any program. In a Pentagon budget that is scheduled to double over the next five years, the Julie case is a horror story. This massive increase in defense expenditures, in my opinion, deserves the most detailed possible scrutiny. This hearing is a significant part of that scrutiny, which is long overdue.

Already, we have former Comptroller General Elmer Staats' estimate of $10 billion, total, in Pentagon waste. Gold-plating, unnecessary bases, and redundant weapons systems all contribute. This Administration has promised to give unusual attention to ending waste, fraud and abuse in all government programs, including defense.

I regard the Loebe Julie matter as a test case of the Reagan Administration's sincerity. If they really want to reduce waste in defense spending, this is the place to start. But Mr. Julie is just the tip of the iceberg. His is only one of many cases where defense waste can be halted. It will take a distinct change in the Pentagon's attitude, as illustrated by this case, for any real savings to be achieved.

It is clear to me that automated calibrations equipment, not manual, should have been purchased and put into use years ago. I hope the Inspector General will agree, and that the Army will then make the changes Loebe Julie has been telling them about for years. One change I would welcome would be a significant contract for Julie Research Laboratories, and a more objective relationship between JRL and the Army.

Finally, let me say that I know Loebe Julie is a persistent man. During his quest, he may have alienated a few people. But it is shocking to think that his personality, or the Army's perception of it, has in any way affected procurement decisons. National security is more important than personality, or who your friends are.

Loebe Julie makes an exceptionally accurate, reliable and speedy calibrations set. It is what the U.S. Army needs. He has done us all a service, too, in showing one way to better use government funds, and how, sensibly and efficiently, to strengthen our national defense.

APPENDIX

AREAS FOR QUESTIONING

Conflicting Army responses to Mr. Julie's claims: The Army has claimed, in various responses, that Mr. Julie's equipment is either too good for Army use; too expensive, and/or unsuitable for the mobile van context used for the field calibrations effort. How is something important to our national defense "too good"? What is the Army's policy on quality? How can Mr. Julie and the Army differ by as much as $250 million (over 10 years) on cost, and possible savings? Does the Army know its workload in calibrations? Has the Army tested Mr. Julie's equipment to see if it would work in a mobile environment? Did it test the currently used equipment?

Automated calibrations equipment: Why is the Army still using manual calibrations equipment? If some automated equipment is useful (the Army has recently purchased 18 small MECCA-type systems), why not more? Has Mr. Julie's automated equipment been adequately considered?

Small business set-asides: Why does the Army purchase large business' equipment through small companies? Why is an inventor-led firm, one of two manufacturers, unable to get contracts designed for such firms?

Level of calibrations quality: What is the Army-wide level of calibrations quality? By command, and by installation?

Calibrations management: Does the Army have enough skilled personnel to insure a good calibrations effort? Why are such technicians leaving the Army in droves? Would purchase of automated equipment ease the problem?

Testing of calibrations equipment: The Army has proposed "test-offs" of Julie equipment against competitors. Has this exhaustive testing been done for other companies' products before purchase?

White Sands Missile Range and GAO reports: Why, after WSMR made favorable report on Julie, was Air Force report then commissioned? GAO reported Julie was not fairly treated by Army. Is this an example? Is Air Force report available (it has been completed)?

Chairman ROTH. Mr. Julie, it is the practice of this committee that you may either read your statement or, if you care to summarize it, it will be included as if read.

Please proceed.

TESTIMONY OF LOEBE JULIE, PRESIDENT, JULIE RESEARCH LABORATORIES, ACCOMPANIED BY JOE WAGER, WAGER & ELEFANTE LAW OFFICES

Mr. JULIE. Thank you.

I have prepared a statement which I would like to enter into the record.

In view of the comments made by the committee and by Senator D'Amato and Congressman Weiss, I think many of the things I was prepared to say on my own behalf have already been said.

I think that some of the material in my statement is worth bringing out because it clearly shows what happened, not only to Julie Research Laboratores and its problems with the Army, but what happens to other high-technology companies, like mine, and may show the Senators that there is a systemic problem and indicate how large the problem really is.

I would like the opportunity to take a little bit of time in bringing this information to the attention of the committee.

In my own case, I have actually been working in defense technology for 40 years. I started early at the end of World War II. I am very much dedicated to strong U.S. defense leadership and industrial leadership. And what has been happening most recently, certainly during the past 7 years, makes me fearful for the success of our industrial sector and for our ability to defend ourselves in case of a war.

I have not in 40 years seen as ineffective military procurement as I see today.

The Senators have touched on the importance of calibration. Essentially all I wish to add is that we now understand that the Army has about 1 million pieces of test equipment to support their weapons, and it is this test equipment that has to be calibrated by more accurate pieces of calibration grade equipment, called calibrators. These calibrators are extremely accurate, specialized devices and large commercial companies prefer not to manufacture them and prefer not to design them.

The problem of calibration, incidentally, became important as far back as 1954, when the U.S. Navy started the development of the Polaris missile system. Even at that time neither large industry nor large Government, including the National Bureau of Standards, were willing to respond to the need for better calibration instruments.

Their position was a status quo position. Don't ask for better calibration equipment, rather downgrade the performance of Polaris. At that time, I had finished several years of experience in computer and fire control systems work, had started my own company—this was 27 years ago—and when the problem came to my attention, decided to spend a little bit of time working on new, more accurate test instrumentation and calibration technology.

The need was so great, in fact, that I have done nothing else for the past 27 years than concentrate on developing improved calibration technology.

As I said, the large companies were not interested in calibration. It is a critically important but small dollar volume market and this does not interest large commercial companies. As a matter of fact, in the years from 1954 to 1960, U.S. calibration technology was developed by smaller companies, like Julie Research Laboratories. This successful small company development of technology has lasted the United States for over 20 years.

I regret to say that starting in 1970, calibration procurements in the Government, which used to go to the small specialized calibration companies, started to go to two large companies. These were the Hewlett-Packard Co., run by Dave Packard, who at one time was active as Deputy Secretary of Defense, and the John Fluke Manufacturing Co., run by John Fluke, who at one time chaired the so-called Fluke Task Force on Electronic Test Equipment, which was a task force jointly sponsored by DOD and large industry.

Starting in 1970, procurements of calibration equipment in the services, not only the Army, but also the Air Force and the Navy, began to go less and less to the original small company calibration technology suppliers and more and more to these two large companies.

Since the large companies did not make particularly high performance calibration equipment, they generally supplied large systems of substantially lower performance commercial equipment.

The unfortunate result of these procurements which were generally restrictive and sole-source, as in the Julie case, has been to put most of the original calibration technology companies out of business. Although we did not mention this in the Julie stories that you have seen, most of my colleagues and competitors in the development of calibration technology no longer exist. Julie is almost the sole survivor of that innovative period.

The large company procurements that we saw were a nightmare from a procurement point of view. They were sole-source procurements that were illegitimate and unjustified by any real need. They were pseudo small business set-asides that flowed through to large business in an interesting type of procurement that industry refers to as the 100 percent small business steal-aside. The steal-aside is worth a hearing on its own and although I won't take the time to go into it now, I will be glad to answer questions on it.

In sum, these combinations of procurements which violate both spirit and letter of the procurement regulations, have been the prevailing ones in military calibration procurement over the past 10 years. And are not getting better, they are getting worse.

In 1973 the Army announced its need for automated, high performance calibration equipment because the Army's manual calibration program in 1973 was too slow, too expensive, and too lacking in quality to satisfy the Army's needs. That was stated in a 1973 Army report, and in several Army documents.

Fortunately for my company, in 1973 we had already developed and had publicly exhibited what was considered a major technological breakthrough—an automated calibration system capable of full performance calibration and working at almost 10 times the speed of the manual calibration equipment that the Army and other people owned. Ten times the speed means one-tenth the labor cost and, since calibration has always been a labor-intensive operation, close to one-tenth the total cost.

We offered this to the Army initially in 1974, and then again and again every time the Army gave us an opportunity, which was not too often, and in many unsolicited proposals. By this time in 1981, I think we have gone through 11 attempts to offer this technology to the Army.

Every one of our bids and every proposal that we made during this entire period was summarily rejected by the Army. One of our bids, the first one, was rejected without even being opened. That one is an outstanding horror story in itself and is covered in great detail in one of our green books.

I am sorry I don't have the time to do justice to the entire horror chronology. What really happened was that each of those procurements, for which we were qualified and rejected, went alternately to either one or the other of these two large commercial equipment companies, either to the Hewlett-Packard Co. or to the John Fluke Co. And that was done either by a fictitiously justified sole-source procurement or by a pseudo competition or by a small business steal-aside. Even under the new administration this pattern is continuing as vigorously as under any previous administrations.

As contrasted to the basic intent of Government procurement regulations, these procurements and evaluations by the Army were flagrantly arbitrary, flagrantly capricious, flagrantly restricted, and were grossly wasteful, grossly inefficient and grossly ineffective. You couldn't draw a more damning indictment of Government procurement than that.

I don't know whether I was more or less aggressive in 1974, probably less. I know I tried, very naively, to bring the facts to successive levels of Army officialdom, under the supposition that Army underlings were making the mistakes and that capable, conscientious Army managers would correct them. After 7 years of trying, what this attempt has taught me is that the Army's decentralized, absentee-management philosophy makes it absolutely impossible for the Army to correct its problems, even under pressure from within or without. There really isn't any effective supervision from upper echelons of the Army to lower. There is no correction of errors that have obviously been made and not even the pretense of internal managerial control and oversight. Instead, there is a rubberstamp (coverup) mechanism which permits each echelon in the Army ladder to rubberstamp the opinion of the lower echelons. That is really all we got from Army management in 7 years. It is still what we're getting.

Finally, in 1980, we made a desperate appeal to General Guthrie, General Rachmeler, and Mr. Daoulas, respectfully requesting an opportunity to discuss the facts, and show the documentation which pointed out the seriousness of the key issues involved. These issues were: the grossly unfair treatment of a high-technology defense supplier; the substantial 30 to 50 percent waste of the citizens' taxes; and the major weakening of U.S. citizens' military defenses. As usual, our request for a meeting was denied.

That was the point at which we decided we had to reach the Congress and the public with the story of what was really going on, and that led myself and Richard Hafer, who is a gifted reporter-cartoonist, I think now well known, to put the whole incredible chronology in the form of the comic book called, "You're Not Supposed To Get Mugged by Your Own Army.' I think by now everyone has seen the book, and it stands for itself. The book is accurate. It is as accurate as the voluminous data and documentation it was drawn on. It has not been rebutted or refuted after a year of GAO and IG investigation.

The sad fact is that the victims of the mugging, the muggees, are three—first, Julie as a high-technology company; second, the U.S. citizen, who is losing several hundreds of millions of dollars and his defense safeguards; third, the fighting Army. The fighting Army is a victim of the Army's own mugging and the fighting Army—the combat soldier and support technician—is actually being deprived of effective equipment and is being deprived of effective field support.

Who is the perpetrator? The mugger is the other Army, not the fighting Army, but the administrative or bureaucratic Army. I think the committee should understand that I am not only very concerned about strengthening U.S. defense generally, but I am very concerned about supporting the fighting Army and I am willing to fight the bureaucratic Army, if necessary, to do that.

Our booklet was very effective. It led to a congressionally mandated GAO investigation requested by Congressmen Addabbo and Weiss, and in March, April, and July of this year, to GAO reports, briefings and letters essentially vindicating the correctness of the Julie position. Congressional pressure also led, finally, to a field test of the Julie equipment, which took place at White Sands Missile Range and the White Sands Missile Range report in July of this year which also vindicated the performance of Julie equipment and the savings and other advantages of the Julie system that the Army bureaucrats had refused to accept.

[Excerpts from the White Sands report follow:]

EXCERPTS

NOTE: See important addenda to original report on pages 1,2,3,6,7, and back page. This material has been added by JRL, based on WSMR data, to show the result of the Army-wide application of JRL 106 systems.

JULIE RESEARCH LABORATORIES (JRL)
LOCOST 106 AUTOMATED
CALIBRATION SYSTEM EVALUATION

BY

H. F. GONZALEZ

JULY 1981

WHITE SANDS MISSILE RANGE, NEW MEXICO

I. INTRODUCTION

Circumstance leading to acquisition of the Julie Research Laboratories (JRL) LOCOST 106 Automated Calibration System.

On 12 May 1978, the Calibration Laboratory, Quality Assurance Office, White Sands Missile Range, New Mexico, was directed to take immediate action to reduce calibration and repair service costs and to improve the effectiveness of the calibration program. The Quality Assurance Office was specifically directed to replace marginally effective Automated Calibration System, i.e., HP 9213C and Fluke Laboratory Automated Calibration System (LACS). (See Appendix A)

An Appendix I, AR 18-1 was prepared and submitted for approval. (See Appendix B) A purchase description was prepared and on 1 May 1979 an Invitation for Bid was issued. Procurement history detailed. (See Appendix C)

II. DESCRIPTION OF TEST

DARCOM/TECOM directed the Calibration Laboratory to evaluate a JRL LOCOST 106 for a period of 90 days, 1 Apr ~~79~~ 81 thru 30 Jun ~~79~~ 81, under WSMR's normal operational environment and workload. (See Appendix D)

The WSMR inventory was surveyed and workload suitable for the JRL 106 were identified. (See Appendix E) In order to saturate the JRL 106 additional calibration programs were prepared "off line" on a HP 9835A desk top computer, HP 2631A line printer, and HP 9885M mass storage. (See Appendix F) Average time required to prepare, implement, and de-bug a calibration program was fifty (50) minutes.*

The JRL 106 was operated by WSMR calibration contractor personnel (RCA) changing operators at four (4) hour intervals. During the evaluation period Thru-put, JRL Runtime, Administrative (paper work), down time due to system failure, system self check and calibration were recorded and validated by the WSMR Comptroller. (See Appendix J) A summary of test results are shown in Figure 1.

III. WORKLOAD FLOW

The workload flow diagram shown in Figure 2 shows the flow of Test, Measuring, and Diagnostic Equipment (TMDE) through the automated and the manual calibration/repair work stations.

TMDE that can be accommodatd by the JRL LOCOST 106 and are calibrated by other means. This is due to four factors:

a. The lack of developed calibration programs or the JRL LOCOST 106.

b. The TMDE is located at remote sites that are more cost effectively served by mobile calibration vans.

*See bottom of page 2

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c. The TMDE is serviced by in-place calibrations.

d. Instrument impatience. (Normal priority is first-in first-out. An impatient instrument is one that cannot be serviced in time with that order. It is then referred to an alternate queue which is shorter)

The calibration standards and equipment for the manual calibration/repair work stations are shown in Figure 3.

IV. SERVICE TIME COMPARISON

A comparison of the JRL LOCOST 106 versus Manual method, HP 9213C, and Fluke LACS based on Calibration Laboratory historical data is shown in Figure 4.

V. COST SAVINGS

An Economic Analysis in accordance with AR 11-28, was prepared for the Manual method, JRL LOCOST 106, HP 9213C, and the Fluke LACS (See Appendix G). A summary of the economic analyses is shown in Figure 5. Appendix H contains detailed cost analysis, an estimate of annual maintenance cost for the JRL LOCOST 106 and measured operator training.

VI. CONCLUSIONS

The JRL LOCOST 106 was determined to calibrate three (3) times faster than the Manual method, and twice as fast as the HP 9213C, and Fluke LACS.

The JRL LOCOST 106 can be a cost effective Automated Calibration System when operated in the WSMR environment or a WSMR type environment.

*WSMR DATA (best estimate)

JRL System	HP System	Fluke System	Manual System
0.8hrs	40 hrs	24 hrs	12 hrs

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SUMMARY OF TEST DATA

for

JULIE RESEARCH LABORATORIES (JRL) LOCOST 106

			JRL	Fluke*
Test Clock Time		512		
Total Production		1032	1032	194
Daily Production		16.0	16	3.2
Number of Failures		0	0	?
Downtime for Corrective Maintenance & Calibration (Self Check)		14.3	2.8%	39%
Downtime Awaiting Parts		0		
JRL Runtime	0.230			
Administrative Time (CLR's)	0.165			
	0.395 Total		.395	.7
Production Time (1032 x .395)		407.6	407.6	135.8
Personal Time		38.5		
Unmeasured Personal Time		14.7		
Misc. Production, i.e., handling inst. & program de-bug		36.9		
Percent Availability of JRL		97.2	97.2%	61%
Percent Production Utilization		81.9	81.9%	26.5%

Figure 1

*WSMR published data from Army LACS Report.

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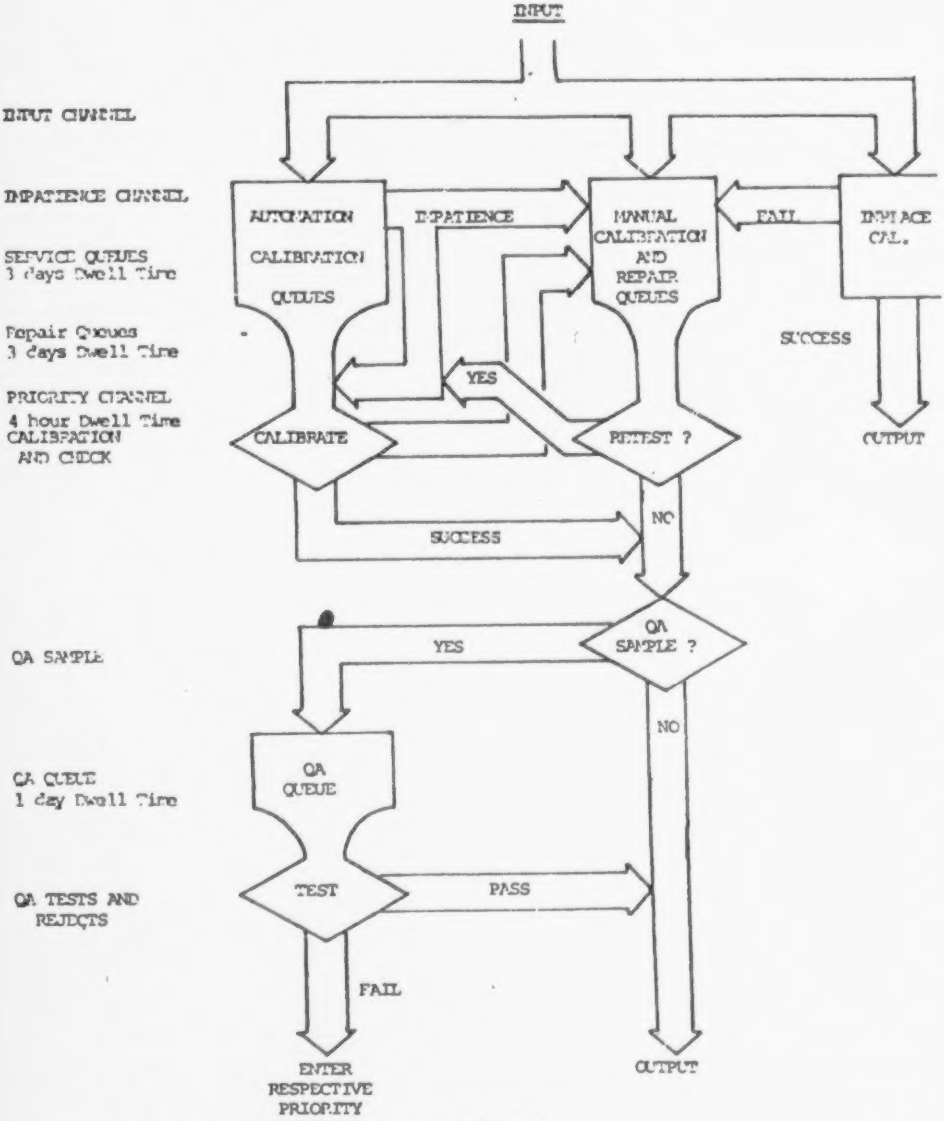
INPUT
INPUT CHANNEL
IMPATIENCE CHANNEL
SERVICE QUEUES
3 days Dwell Time
Repair Queues
3 days Dwell Time
PRIORITY CHANNEL
4 hour Dwell Time
CALIBRATION AND CHECK
QA SAMPLE
QA QUEUE
1 day Dwell Time
QA TESTS AND REJECTS
AUTOMATION CALIBRATION QUEUES
IMPATIENCE
MANUAL CALIBRATION AND REPAIR QUEUES
FAIL
INPLACE CAL.
SUCCESS
OUTPUT
YES
CALIBRATE
RETEST ?
NO
SUCCESS
QA SAMPLE ?
YES
NO
QA QUEUE
TEST
PASS
FAIL
ENTER RESPECTIVE PRIORITY CHANNEL
OUTPUT

Figure 2
6

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MANUAL CALIBRATION STANDARDS & EQUIPMENT REQUIRED

Manufacturer	Model	Nomenclature	Cost
DIGITAL/DIFFERENTIAL			
Fluke	7105A	DC Calibration Sys	$10,620
Fluke	5200/ 5215A	AC Calibration Sys	$5,645 $3,945
Valhalla	2500	Current Calibrator	$895
ESI	SR-1 (set)	Resistance Std	$720
VTVM'S			
Fluke	5100A	Meter Calibrator	$6,995
HP	652A	Freq Response Test	$1,200
VOM'S			
Fluke	760A	Meter Calibrator	$4,495
RESISTANCE			
ESI	1700/1701B/1705B	Resistance Calibrator	$3,285

SERVICE TIME COMPARISON

	Manual Calibrate Only 1980 Data	1 year 9213C Calibrate Only 1976 Data	1 year LACS Calibrate Only 1978 Data	3 months JRL 106 Calibrate Only	1 year JRL 106 Calibrate Only
# Models	454	29	66	228	
# Instruments	2044	291	455	1032	
# Calibrations	2868	428	614	1032	4032*
# Hours	3691	355	452	418	
Average Hours	1.3	.8	.7	.395	

Average Instrument Repair Time 1.3

*WSMR DATA

Figure 4

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SUMMARY OF ECONOMIC ANALYSES

Type of Equipment	Non-Recurring Investment	Recurring Operations	Annual Cost	Discounted Annual Cost	Uniform Annual Cost
Manual	$123,500	$688,128	$811,628	$599,251	$107,066
JRL 106	$173,600	$249,248	$422,848	$339,995	$60,746
9213C	$600,000	$561,520	$1,161,522	$965,253	$172,459
LACS	$262,500	$429,280	$691,780	$550,760	$98,403
WSMR DATA AT $16.18/hr					
Manual (Army)*	$123,500	$1,479,000	$1,602,500	$1,152,563	$204,916
JRL (Army)qty 200	$ 80,000	$ 249,248	$ 329,248	$ 250,700	$ 44,792
JRL (Army)qty 100	$ 90,000	$ 249,248	$ 339,248	$ 260,240	$ 46,496
JRL (Army)qty 50	$100,000	$ 249,248	$ 349,248	$ 269,780	$ 48,201
WSMR DATA AT $16.18/hr + 55% Labor Overhead (See Appendix I - Estimated Maintenance Cost)					
Manual (Army)	$123,500	$2,292,000	$2,415,500	$1,721,394	$307,555
JRL (Army) qty 200	$ 80,000	$ 386,334	$ 466,334	$ 346,615	$ 61,928

*Army-wide productivity = 2.8 hrs/cal rather than WSMR productivity = 1.3 hrs/cal

Figure 5

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DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVENUE ALEXANDRIA VA 22333

17 [illegible]

DRCQA-PC

SUBJECT: Evaluation of Julie Research Laboratories (JRL) LOCOST 106 Automated Calibration System

THRU: Commander
US Army Test and Evaluation Command
Aberdeen Proving Ground, MD 21005

TO: Commander
US Army White Sands Missile Range
White Sands Missile Range, NM 88002

1. As a result of Congressional inquiries and related meetings, the Army has agreed to evaluate one of the Julie Research LOCOST 106 automated calibration systems which was procured for use at White Sands Missile Range. The evaluation is to be conducted under the normal WSMR operational situation.

2. The evaluation plan and report requirements are provided at inclosure 1. It is requested that the report be validated by the WSMR comptroller prior to submittal to this Headquarters.

FOR THE COMMANDER:

1 Incl
as

S. J. LORBER
Director
Product Assurance

CF:
Cdr, WSMR, ATTN: STEWS-QA-C

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Appendix A

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is TAGCEN.

REFERENCE OR OFFICE SYMBOL	SUBJECT
STEWS-CG	Optimizing the Calibration Program

TO SEE DISTRIBUTION FROM CG DATE 12 MAY 1978 CMT 1

1. QA will take action immediately to reduce calibration and repair service costs and to improve the effectiveness of the calibration program. The scope of these actions includes all WSMR TECOM activities, Contractors and Tenants using DE 93 funds. Each action will consider user applications, justifications and program priorities. Any impasse will be subject to Command review and resolution.

2. The Quality Assurance Office is directed to do the following beginning 1 June 1978:

a. Reduce the repair limits to 15% of acquisition costs for one time calibration/repair and 25% of acquisition costs for life cycle costs. When estimates of repair costs exceed these limits user input will be solicited prior to disposal action.

b. Take possession and turn-in items of user property which has questionable utility, utilization, high repair/calibration costs, or limited economic life. The determination to take possession of an item will be made by the Quality Assurance Office.

c. Replace (as funds become available) marginally effective automated calibration systems using I&M funds.

d. Review and approve all acquisitions of TMDE which require calibration regardless of cost.

3. Other effected organizations will accommodate these activities.

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O. L. TOBIASON
Major General, USA
Commanding

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TAB B

DA FORM 1 FEB 62 2496 REPLACES DD FORM 96, WHICH IS OBSOLETE.

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EVALUATION PLAN
JULIE RESEARCH LABORATORIES (JRL) AUTOMATED
CALIBRATION SYSTEM, LOCOST 106

1. Purpose. To evaluate the performance of one JRL LOCOST 106 system (herein after referred to as JRL-106) at White Sands Missile Range (WSMR).

2. Evaluation Period. 1 April 1981 through 30 June 1981.

3. Evaluation Requirements. The evaluation is to be conducted under the normal WSMR operational situation and workload. The evaluation is to include the following:

a. Workload applicable to JRL-106.

(1) Identify specific items by the manufacturer, model number, and quantity of WSMR TMDE inventory planned to be calibrated by the JRL-106.

(2) Identify those items which the JRL-106 can accomodate but will be calibrated by some other means and include rationale for not using the JRL-106 for such items.

b. Workload Flow:

(1) Automated. Using a flow diagram, show the flow of the TMDE from receipt by the calibration facility through the JRL-106 and back to the customer. Show the flow paths for TMDE which is in tolerance as well as TMDE which requires repair/adjustment. Indicate the average dwell time at each stop along the path. Show the calibration standards and equipment by manufacturers' model numbers and quantities at the repair/adjustment work station(s). Include the cost of the calibration and repair standards/equipment involved in this flow.

(2) Manual. Using a flow diagram show the flow of the TMDE through manual calibration/repair work stations. Include similar information to the described in 3.b.(1) above. Include the calibration standards and equipment required, by manufacturers' model numbers and quantities. Quantities indicated are to reflect those required to accomplish the workload identified as applicable to the JRL-106. Include the cost of the calibration and repair standards/equipment involved in this flow.

c. Time savings JRL-106 vs Manual Method. During the evaluation period, maintain records of TMDE items calibrated with the JRL-106 by manufacturers' model numbers and time required to calibrate each item. Using the data recorded, determine average calibration time using the JRL-106. Compare that average time to that required using manual methods. The time for manual methods should be based on historical data if available, if not available, estimates may be used.

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d. JRL-106 Usage/Availability. During the evaluation period maintain records as follows:

(1) Number of hours per work day the JRL-106 is in use.

(2) Number of failures.

(3) Down time for corrective maintenance.

(4) Down time for preventive maintenance and calibration.

(5) Down time attributable to awaiting parts.

(6) Based on the above, project the percent availability of the JRL-106.

e. Cost Savings.

(1) Calibration. Based on time savings determined in 3.c. above calculate the cost savings during the evaluation period and project the savings for a one year period.

(2) Equipment Cost Savings. Identify the manual type equipment replaced by the JRL-106 and its estimated value at the time of replacement.

(3) Maintenance Cost. Provide cost estimates of annual maintenance costs for the JRL-106 and for the manual type equipment which it replaced.

(4) *Training. Provide cost estimates for training calibration technicians for the JRL-106 and for manual systems.

f. Procedures. Provide a listing of the calibration procedures by TMDE manufacturers' model numbers, which have been prepared for use with the JRL-106 and provide the average time required per procedure.

4. Evaluation Report. A report of the evaluation results are to be submitted to HQ DARCOM, DRCQA, by 1 August 1981. The report is to be validated by the WSMR comptroller. The report is to include as a minimum the data/information identified in paragraph 3 preceding. Any other data/information relative to the JRL-106 performance at WSMR should also be included in the report.

*WSMR DATA based on 40 weeks required for manual calibration training.

	JRL System	Manual System
Experienced Operator	16 hrs	——
Unskilled Operator	80 hrs	1600 hrs

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Mr. JULIE. That should have been the end of the problem but unfortunately it is not because the procurement horror stories and the nightmare and the muggings are still continuing. Because of the Army's continued attempt to ignore the cost avoidance that is possible with this technology Dick Hafer and I have taken the data from the White Sands Missile Range report and from other official Army reports and charted it for the benefit of the committee.

The competition between calibration technologies is in five key areas. The first chart shows programing time. This is a critical software characteristic, and data available from the White Sands report and other Army sources shows the comparable programing time for the Julie system, the Fluke system, the Hewlett-Packard system and the Army Manual system. I apologize for a typographical error. The first column should be 0.8 hours. The Fluke time is 24 hours, or 30 times slower. The Hewlett-Packard is 40 hours, or 50 times slower, and Manual is 12 hours, or 15 times slower. [See exhibit A-1, p. 513.]

If programing time is the first competitive hurdle, on a scale of 10, Julie would score 10 and the others would score zero.

The second competitive parameter of performance for calibration technology is reliability. Julie reliability from the White Sands report is 2.8 percent downtime, and downtime for the Fluke system of 39 percent. White Sands did not have available data on downtime for the Hewlett-Packard system. The Hewlett-Packard system, by the way, is no longer in contention since the Hewlett-Packard Co. has taken it out of production. Competitive score Julie 10, Fluke 1. [See exhibit A-2, p. 513.]

In the productivity competition—the broad jump—White Sands data shows the Julie productivity as 4,032 calibrations per year, while Fluke is 614, Hewlett-Packard 428, and Manual 700. [See exhibit A-3, p. 514.]

On a scale of 10, Julie would be 10, and the others would be 1 or 2. There is no doubt about the relative performance there.

The next competition is total cost per year. By taking the White Sands data and methodology with additional Army and White Sands information, the comparable cost per year, Armywide, would be $59,000 for one Julie system, $326,000 for Fluke to do the same work as one Julie system and $326,000 for Manual equipment to do the same work as the Julie system. Julie, Fluke, and Manual score 10, 2, and 2 respectively. [See exhibit A-4, p. 514.]

And finally, there is the very important area of operator training. The Army has recently insisted on buying Manual equipment even though it is very difficult for the Army to recruit and train Manual operators, as we all know. In the training competition, an unskilled operator can be trained in 80 hours to operate the Julie system but would take 1,600 hours to be trained to operate the Manual system. Julie 10, Manual 0. [See exhibit A-5, p. 515.]

Now, here is the best, most official and audited data available showing comparative performance and the present administration of the Army, including the Under Secretary of the Army, still refuses to discuss it.

A GAO letter dated July 15, 1981, addressed the savings difference caused by the higher productivity of the Julie system. Since calibration is labor-intensive, anything you do to speed up the process should save money.

The Army, however, claimed in their evaluation of the Julie system that Julie's higher productivity would lose the Army $41 million. As part of the GAO investigation, the GAO found major errors in the Army's calculations and in the Army's assumptions, used to justify the Army's claimed $41 million Julie loss. [See exhibit B-1, p. 515, and exhibit B-2, p. 516.]

The GAO letter, using understated Julie productivity data, shows that the Julie system could save $134 million. And using productivity substantiated by White Sands Missile Range, the GAO letter shows potential savings of $162 million. [See exhibit B-3, p. 516.]

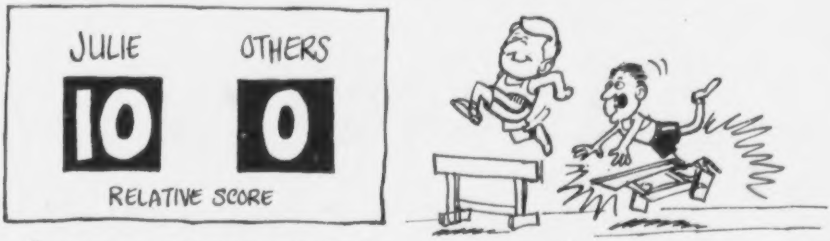
Finally the GAO letter shows that even when the Army, in new baseline calculations, grossly understates the cost of a technician to the Army—divides it by two—there is still a Julie savings potential of $60 million. [See exhibit B-4, p. 517.]

Unfortunately, despite this vindication by GAO, WSMR and other official industry and Army data, the Army still refuses to see any measurable savings or performance advantages in the Julie technology.

[The exhibits referred to follow:]

① PROGRAMING TIME

JULIE	FLUKE	H.P.	MANUAL
.08 HOURS	24 HOURS	40 HOURS	12 HOURS


JULIE
OTHERS
10
0
RELATIVE SCORE

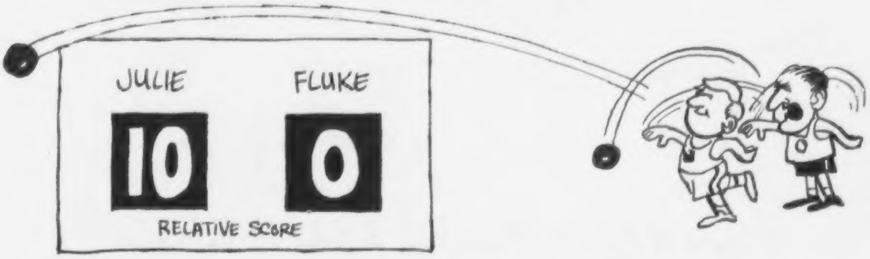
(TAKEN FROM ARMY'S OWN FIGURES)

JULY 1981, WSMR, "LOCOST 106 AUTO. CAL. SYSTEM EVAL.", WITH WSMR & ARMY LCS DATA ADDENDA

EXHIBIT A-1

② RELIABILITY (DOWNTIME)

JULIE	FLUKE
2.8%	39%


JULIE
FLUKE
10
0
RELATIVE SCORE

(TAKEN FROM ARMY'S OWN FIGURES)

JULY 1981, WSMR "LOCOST 106 AUTO. CAL. SYSTEM EVAL.", WITH WSMR & ARMY LCS DATA ADDENDA

EXHIBIT A-2

③ PRODUCTIVITY (THROUGHPUT)

JULIE	FLUKE	H.P.	MANUAL
4032 CALIBRATIONS PER YEAR	614 CALIBRATIONS PER YEAR	428 CALIBRATIONS PER YEAR	700 CALIBRATIONS PER YEAR

JULIE	FLUKE	H.P.	MANUAL
10	2	1	2

RELATIVE SCORE

(TAKEN FROM ARMY'S OWN FIGURES)

JULY 1981, WSMR "LOCOST 106 AUTO, CAL. SYSTEM EVAL.", WITH WSMR & ARMY LCS DATA ADDENDA

EXHIBIT A-3

④ TOTAL COST PER YEAR

JULIE	FLUKE	MANUAL
59,143	326,921	326,823

JULIE	FLUKE	MANUAL
10	2	2

RELATIVE SCORE

(TAKEN FROM ARMY'S OWN FIGURES)

JULY 1981, WSMR "LOCOST 106 CAL. SYSTEM EVAL.", WITH WSMR & ARMY LCS DATA ADDENDA

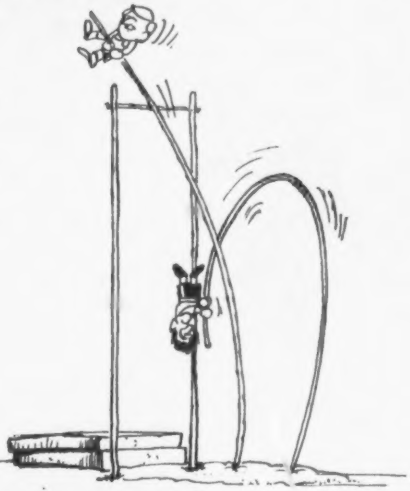
EXHIBIT A-4

⑤ OPERATOR TRAINING

JULIE	MANUAL
80 HOURS	1600 HOURS

JULIE	MANUAL
10	0

RELATIVE SCORE



(TAKEN FROM ARMY'S OWN FIGURES)

JULY 1981, WSMR "LOCOST 106 AUTO. CAL. SYSTEM EVAL."; WITH WSMR & ARMY LCS DATA ADDENDA

EXHIBIT A-5

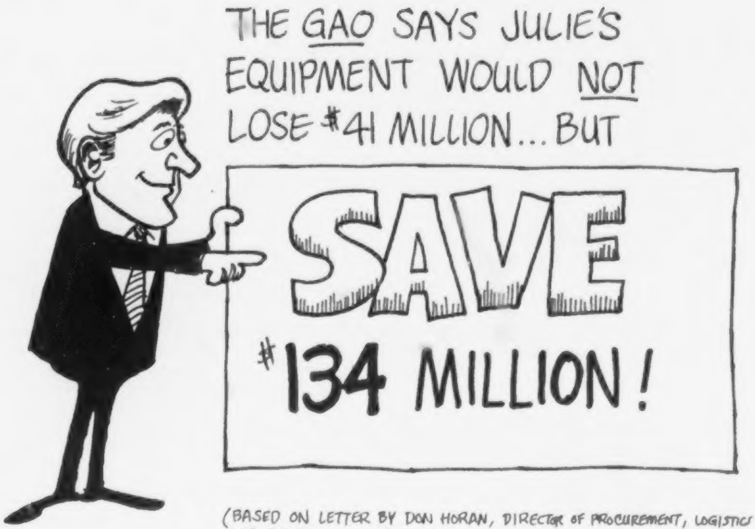
THE ARMY SAYS THAT JULIE'S SYSTEM WOULD

LOSE

$41 MILLION!

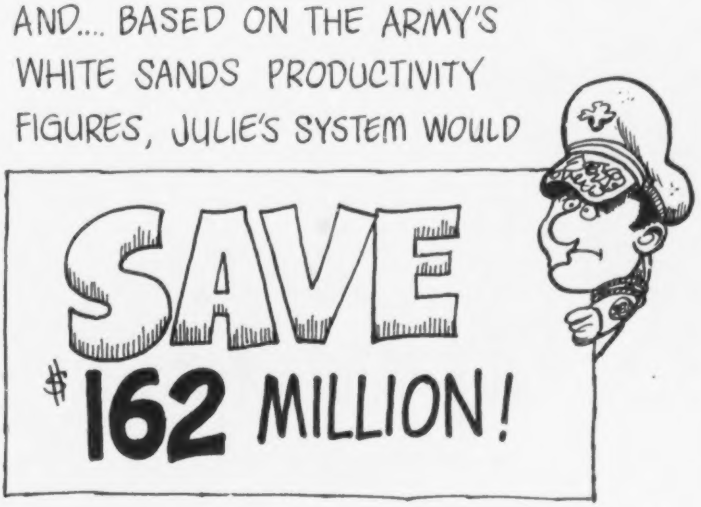
(AMCC REPORT - FEB. 1981)

EXHIBIT B-1


THE GAO SAYS JULIE'S EQUIPMENT WOULD NOT LOSE $41 MILLION... BUT
SAVE
$134 MILLION!

(BASED ON LETTER BY DON HORAN, DIRECTOR OF PROCUREMENT, LOGISTICS AND READINESS DIVISION, GAO - JULY 15, 1981)

EXHIBIT B-2


AND.... BASED ON THE ARMY'S WHITE SANDS PRODUCTIVITY FIGURES, JULIE'S SYSTEM WOULD
SAVE
$162 MILLION!

(BASED ON WSMR CALIBRATION EVALUATION - JULY 1981)

EXHIBIT B-3

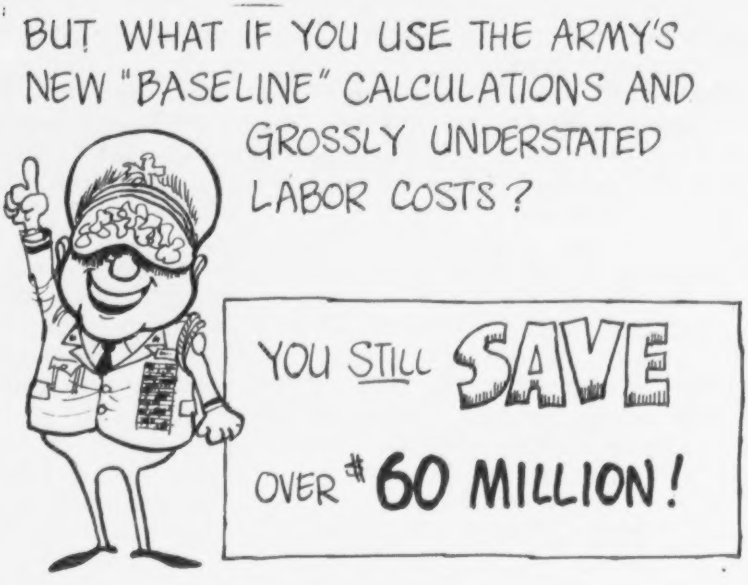

BUT WHAT IF YOU USE THE ARMY'S NEW "BASELINE" CALCULATIONS AND GROSSLY UNDERSTATED LABOR COSTS?
YOU STILL SAVE OVER $60 MILLION!

EXHIBIT B-4

Mr. JULIE. Where do we now stand? My company, after 7 years vindicated by the GAO report, vindicated by the White Sands report and vindicated by the Army IG investigation report is on the point of going out of business. We have systematically been starved out of all of the Army's calibration procurements for the last 7 years. In August we informed the Army and the Congress that we had run out of time and would have difficulty surviving much longer.

In spite of that, and in spite of the favorable GAO results and the favorable White Sands Missile Range results, the Army essentially awarded a small contract that would have been enough to sustain Julie for 6 months, again to the Fluke Co. They did this in a "100 percent small business set-aside" that is being actually supplied by the Fluke Co. through a small business in Huntsville, Ala. This is that quirk called the small business steal aside—anything to keep Julie from getting even a tiny share of the Army's business.

What else? Even after being alerted to this mess for 7 years and even after the new administration has been in office for almost a year, the fighting soldier's calibration and weapons system support continues in a weak and labor-intensive mode. Reports from Europe and elsewhere show that Army calibration failures are as high as 50 percent in some depots. The Army will deny this and I would like the opportunity after the Army has spoken to show the Army's own figures. Why are the Army's calibration failures this high?

Simply because five technicians using obsolete Manual equipment, which the Army is still buying, are needed to do the job that one technician could do with our equipment. It takes five technicians instead of one and the Army doesn't have the five technicians, so they don't do the job.

What else? Both the U.S. Defense budget and the taxpayer continue to be shortchanged. The cost estimates that I have brought to your attention, and other industry cost estimates and a variety of calculations all point to a Julie cost of $15 for one calibration and a non-Julie cost of $60 for one calibration. And it is really not more complicated than that no matter what the Army says.

The difference between the $15 and $60 represents a potential 75-percent cost avoidance. In other words, by refusing to use this technology, the Army is deliberately shortchanging the taxpayer 75 percent in this area. The Army submitted data to Congressman Addabbo showing that this would be applicable to about a quarter of a million calibrations per year. That works out to $11 million per year, approximately $1 million per month. Thus far, over 7 years, the Army has very callously wasted 84 months, $84 million, plus substantial additional money spent on the misprocured Hewlett-Packard and Fluke systems which they eventually scrapped. Over the 7-year period, they have very callously wasted $100 million.

What else?

The new administration talks about the calibration mobilization base, or the mobilization base in general. They talk about surge capability and the need to have more than one supplier to back up the Army's future defense needs. There are today two companies left making this kind of calibration equipment, the Julie Co. and the Fluke Co. Julie is a small company, Fluke is a large company. Actually, Julie was the originator of this technology, the first company to make the technology that Fluke now also makes. Fluke was not the originator.

Mobilization base philosophy, as I understand it, indicates that you should support a minimum of two suppliers in every area. That would be Fluke and Julie or Julie and Fluke, but Julie is being totally eliminated from this picture. We are receiving absolutely no support and no consideration within the Army. That weakens and narrows the mobilization base.

Finally, in general, U.S. defense industry and productivity are not doing too well. We are having technology problems not just within the Army, military and defense but also in commercial industry.

We are not getting a sufficient infusion of new and improved technology. We cannot maintain any kind of military or industrial leadership without new technology. I believe that Government procurements play a substantial role in this area and that procurements which go to status quo companies and that do not nurture new technology companies are extremely destructive to industrial as well as military leadership. On the other hand, Government procurements which also support innovative small companies as well as status quo large companies can play an extremely positive role in industrial as well as military progress in the United States. Two good examples are, President Thomas Jefferson who defended the then small Eli Whitney Co. against an Army contract cancellation and won not only improved mass-produced rifle technology for the Army but, as a result of the consequent technological advances produced by the Eli Whitney Co., also won world leadership in industrial production for the United States. All this came from what at one time was a small company.

Similarly, President Teddy Roosevelt interceded for the then small Orville and Wilbur Wright company against a stubborn 5-year Army refusal to procure their airplane. The result of President Roosevelt's intervention was that he not only won improved airplane technology for the Army but, through the consequent technological advantages of the Wright Aircraft Co., won world leadership in commercial aviation for the United States.

Those are the positive examples. Here is a negative one. The Government did not help Robert Goddard, who is the father of rocketry. As a result, the United States, which could have had world leadership in rocketry lost it to the Germans who quickly made use of Goddard's ideas and patents. Germany made good or bad use of rocket technology during World War II, bad use as far as the Allies are concerned, and the only reason we partially recaptured it was that when Germany was defeated, both we and the Russians ran in to pick up German rocket technology which was really Goddard's.

If the U.S. Government had supported Goddard in his lifetime, it is unlikely that either the Germans would have gotten it or the U.S.S.R., and the U.S.S.R., if it had not gotten Goddard's rocket knowledge, would not be the threat to the United States and the free world that it is today.

The only thing I have left to say is that we are looking at a current example. I believe the United States badly needs improved maintenance technology and I think one of the Senators commented to this effect. It is my opinion that such improved maintenance technology, which means improved calibration technology, would constitute a second industrial revolution. That is, the reduction of the high labor cost of the maintenance, a tenfold reduction, could do as much for U.S. industry and defense as the tenfold reduction in manufacturing costs did for U.S. manufacturing when Eli Whitney introduced it.

My own efforts have been designed to check such tenfold improvement in maintenance costs for the types of equipment used not only by the Army, but by the entire military and all of U.S. industry.

This could have an enormous potential benefit for the United States at large. Unfortunately, as a result of the adverse procurement actions of the Army and unless we receive genuine support from either the Congress or the President, I believe that the United States will not only lose my company as a mobilization base supplier, but will lose the opportunity for the substantial savings and improvements we have offered the Army and will also lose the potentially revolutionary benefits of this new technology for the rest of our defense and industrial society. This may well be a major loss. I thank the committee for permitting me to testify.

Chairman ROTH. Thank you, Mr. Julie. We will follow the 10-minute rule and take members questions in the order they arrived. We call this the early bird rule.

Mr. Julie, you cited the White Sands and other tests that were made that showed your calibration equipment to be better than others. Is your equipment currently used by any major organization, either Navy, Air Force, or anyone else in Government at this time?

Mr. **Julie**. Yes; besides White Sands, which is an Army base, our company is used by aerospace companies like Grumman Aerospace, General Electric Space Center, Newport News Shipyard, which is a commercial company, General Dynamics—a list of about 10 or 11 companies. Except for the White Sands missile range application, they are all industrial.

Chairman **Roth**. Have you any evidence or tests as to the results these companies found in using your equipment?

Mr. **Julie**. Yes, beginning in 1975 or 1976, we began to get corroboration from the industrial users of our equipment that the claims we had made, of outstanding performance, were all substantiated and we did include that information in submissions to the Army. Those were all sent to the Army's Darcom as an indication that there was corroborated data from industry on our claims.

Chairman **Roth**. I would request that you submit those for purposes of the record here.

Mr. **Julie**. Fine.

[The information referred to follows:]

GRUMMAN AEROSPACE CORP.,
Bethpage, N.Y., March 4, 1981.

Mr. JOHN A. RINKO,
U.S. General Accounting Office,
Washington, D.C.

DEAR MR. RINKO: This letter is in reply to your letter dated 30 January 1981 requesting information relative to Grumman Aerospace Corporation's use of a Julie Research Laboratories, Inc., Automated Calibration System, JRL Locost 106.

The following information is based on Grumman's experience with the JRL 106 system which has been operational in our Quality Assurance, Measurement Standards laboratory since May 1967.

The 10 questions asked in your letter have been restated with answers following each. If any further information is required, please feel free to contact me again.

Yours truly,

CHARLES E. WEBER,
Engineering Supervisor.

Enclosures.

GRUMMAN AEROSPACE CORP. REPLY TO GAO LETTER DATED JANUARY 30, 1981

Question. I have been advised that the JRL LOCOST 106 does not have the capability to perform on-line adjustments of an instrument under test. Is this correct?

Answer. The JRL LOCOST system can be used to perform on-line adjustment of an instrument under test. Grumman regularly uses it in this mode of operation.

Question. How many programs have you developed for the LOCOST 106 and what is the typical time required to prepare a program?

Answer. Approximately seven hundred (700) calibration programs have been developed by Grumman for use with the JRL LOCOST. Program preparation time ranges from fifteen (15) minutes to one (1) hour per program depending upon the complexity of the instrument to be tested. Most programs take thirty (30) minutes or less.

Question. I would like a copy of the Grumman Calibration Procedures No. 1100004G (latest edition) entitled, "General Calibration Using JRL 106 Calibration System."

Answer. A copy of 1100004H is enclosed.

Question. What do you believe to be life expectancy of the JRL 106?

Answer. A life expectancy of 12 to 15 years is anticipated for the JRL LOCOST. The Grumman owned system was placed in service in May of 1967. In excess of 10,000 operating hours have been accumulated to date.

Question. What has been the maintenance cost on the JRL LOCOST 106?

Answer. Maintenance cost has been approximately $11,500.

Question. Are there other off-the-shelf calibrators that will perform as well as the JRL LOCOST 106?

Answer. To my knowledge there are no other calibrators that will perform as well as the JRL LOCOST 106.

Question. How do you maintain the JRL LOCOST?

Answer. The JRL LOCOST is calibrated and repaired by Grumman personnel. Certain repairs are performed by the manufacturer, however, due to the need for special skills and/or parts (i.e., the Hewlett-Packard computer/controller).

Question. The enclosure to this letter indicated some performance parameters needed by the Army's field calibration units (AN/GSM-287). Can you comment on whether the JRL LOCOST 106 provides capability, with optional equipment or otherwise, on any items marked "none"?

Answer. Grumman has, through optional equipment, increased the range of the JRL LOCOST in True RMS AC Voltage, High DC Current and High DC Voltage measurement. Although other options are available, Grumman has no experience with them.

Question. What is your opinion as to the possibility of replacing your JRL LOCOST with a Fluke 5100B, or a Fluke 70405 and what would the impact be on your operation if manual type equipment were used?

Answer. The Fluke 5100B cannot replace the JRL LOCOST. The 5100B is not capable of performing a complete calibration on many instruments. It was designed for "in place", partial testing of instruments for limited use purposes under the Navy MECCA program and later marketed commercially. The Fluke 7405 system uses additional equipment to extend the range and accuracy of the 5100B. This system can perform some of the tasks for which the JRL LOCOST is used. However, until a more thorough evaluation of this new systems specifications is made we cannot comment further on it. If manual equipment were to be used in place of the JRL 106 two (2) additional personnel and two (2) additional sets of supporting manual equipment would be needed.

Question. What is the volume or throughput of calibrations you are achieving on the JRL LOCOST 106?

Answer. Approximately three thousand (3,000) calibrations per year are processed through the JRL LOCOST on a single shift basis.

COMPTROLLER GENERAL OF THE UNITED STATES,
Washington, D.C., April 3, 1981.

Subject: Allegations of improper procurements by the Army Metrology and Calibration Center (PLRD-81-16).

Hon. JOSEPH P. ADDABBO,
Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: In response to your July 22, 1980, letter and in subsequent discussions with your Office, we reviewed allegations by Julie Research Laboratories (JRL) Inc., that operations at the U.S. Army Metrology and Calibration Center, Huntsville, Alabama, are inefficient and wasteful and that the Center's procurement practices are restrictive. JRL's allegations are depicted in its 1980 cartoon booklet, "You're Not Supposed to Get Mugged By Your Own Army." Our findings and conclusions, which were discussed with your Office on March 25, 1981, are as follows:

The Army, contrary to what it has told JRL, has both laboratory and field requirements for automated calibration equipment.

The Army's technical evaluations of JRL's equipment appear to be based on some questionable conclusions and assumptions and largely ignore favorable impressions by Army representatives who saw the equipment in operation.

We cannot verify the Army's nor JRL's cost analyses at this time because both used estimated workload data and other unsupported assumptions.

Our findings and conclusions are based on interviews and examinations of records at Headquarters, U.S. Army Materiel Development and Readiness Command (DARCOM), Army Metrology and Calibration Center, JRL offices, White Sands Missile Range, and a commercial user of JRL equipment.

Although we did not review each JRL allegation in detail, we believe our work has disclosed that the Departments of Defense and the Army need to reexamine the field Army requirements for calibration equipment and to test various equipment in the operating environment. Such tests should establish the most cost-effective equipment that will satisfy valid Army requirements.

BACKGROUND

The Army's calibration and repair program is designed to validate the accuracy of test equipment and to provide necessary adjustments and repairs. DARCOM is responsible for the program.

The calibration and repair program is managed and operated differently for the field Army and for industrial-type Army calibration facilities. The primary mission of the field Army program is to support tactically deployed, general-purpose test equipment in the hands of field Army troops. This is done through mobile and fixed calibration teams scattered worldwide and managed by the Army Metrology and Calibration Center. In the event of mobilization for war, some of these calibration teams are assigned and deployed with the tactical combat units they support. The Army must have full mobility for these teams. The industrial-type Army calibration facilities are fixed and provide calibration support to depots, laboratories, arsenals, proving grounds, and ranges. They are managed by the operating commands which they support.

According to 1978 Army data, the estimated calibration workload for the field Army is 570,000 calibrations a year and 270,000 for other calibration facilities. Because of the Army's recent realinement combining calibration and repair support to the tactical units, DARCOM officials explained that current workload information, showing the major categories of items calibrated and the locations where those calibrations were made, is not readily available from Army records.

THE ARMY HAS REQUIREMENTS FOR AUTOMATED CALIBRATION EQUIPMENT

The Army told JRL that it does not have requirements for automated calibration equipment for the field Army. Various studies and procurements show, however, that the Army has requirements for automated calibration equipment for both the field Army and other calibration facilities.

During the 1970's, the Army and the National Bureau of Standards recognized the Army's need for automated calibration equipment in both the field Army and other calibration facilities. For example, the Army bought an automated calibration system in December 1974 and another in February 1975 to test the feasibility of using automated equipment in mobile vans for the field Army. The Army also bought five laboratory automated calibration systems in 1975 because inspections showed that laboratory calibration programs were either marginal or inadequate. In addition, in 1976 the National Bureau of Standards recommended that automation of the vans be accelerated because manual equipment may not be adequate to support future computer controlled weapon systems.

The Army's experience with automated equipment during the 1970's, however, was not very good. For example, an Army Metrology and Calibration Center May 1978 report concluded that no laboratory had fully used the five automated systems. According to laboratory reports, the systems were not fully utilized because of maintenance problems and availability of programs. Army officials told us that they believe that failure to use the laboratory automated systems was due to lack of management emphasis and the unwillingness of laboratory technicians to use automation. Two of the five automated systems are no longer being used and one system is being phased out of operation. Also, tests to determine the feasibility of using automated equipment in mobile vans were terminated before completion because they conflicted with another Army test program for the automated test support being developed at another Army activity.

Recent calibration equipment purchases show a continuing need for automated calibration equipment. Army officials told us the field Army does not need large automated systems, such as those used in laboratories, but it does need small automated systems. For example, as of March 1981, the Army purchased 18 automated meter calibrators from the John Fluke Manufacturing Company, Inc., to supplement manual equipment in Europe and to decrease the time required for meter calibrations. Army officials believe that because these automated meter calibrators will improve overall efficiency, the resulting productivity increases can be used to help reduce the growing backlog of equipment needing repair. Nine systems have been delivered to the Army but have not yet been sent to Europe.

Also, White Sands Missile Range bought two of JRL's LOCOST automated meter calibrators in September 1979 to replace marginally effective automated calibration equipment. The LOCOST systems were delivered in September 1980.

ARMY TECHNICAL AND COST EVALUATIONS OF JRL EQUIPMENT WERE INCONSISTENT

Army officials insist that JRL did not bid in response to what the Army determined its requirements to be, but instead submitted unsolicited proposals which were JRL's assessment of how its equipment could fill the Army's requirements. By submitting two unsolicited proposals, JRL caused the Army to consider using JRL automated LOCOST systems in its calibration and repair program. The first proposal, which was submitted in May 1976, projected that the Army could save $13 million annually by establishing three high-speed automated calibration facilities using LOCOST systems. The second proposal, which was submitted in October 1979, projected that the Army could save $200 million over a 10-year period by installing 69 leased LOCOST systems in 138 mobile vans partially equipped with manual equipment instead of completely outfitting 200 mobile vans with manual equipment.

The Army completed its technical and cost evaluations of these two unsolicited JRL proposals in March 1977 and January 1980, respectively, and reported that the LOCOST system would not perform as claimed and would not be cost effective. As discussed below, it appears that the Army based its evaluations on some questionable assumptions and ignored favorable impressions by several Army representatives who saw the LOCOST system in operation.

Technical evaluations

DARCOM, in response to JRL's May 1976 unsolicited proposal, completed the first evaluation of JRL's LOCOST system in March 1977. DARCOM concluded that equipment and programs offered by JRL were not new or unique to the industry nor were they state of the art. DARCOM based its conclusions on (1) comparisons of the technical characteristics of the LOCOST system with other systems and (2) assumptions about the LOCOST system's performance capabilities. However, DARCOM may have understated performance capabilities of the LOCOST system and overstated performance capabilities of competing systems. DARCOM also appears to have discounted favorable reports from Army representatives who observed the LOCOST system in operation. For example:

DARCOM reported that the Modularly Equipped and Configured Calibrator/Analyzer (MECCA) would calibrate about 80 percent of the direct current/low frequency workload and about 50 percent of the total Army workload, including meters, signal generators, oscilloscopes, counters, and pressure gages. At that time, the Army had not received a MECCA system with these capabilities, and in fact prototype MECCA equipment received at a later date did not effectively calibrate signal generators, counters, and oscilloscopes. Furthermore, the prototype MECCA meter calibrator had unacceptable problems and limitations.

DARCOM was skeptical of JRL's claim that equipment could be programed in about 15 minutes because the Army's experience with competing systems showed an average requirement of 120 hours. Representatives of Harry Diamond Laboratories and the Army Metrology and Calibration Center, however, had reported observing program preparation for a simple test instrument in less than 3 minutes and the instrument's calibration in another 3 minutes. The Harry Diamond representatives also reported that (1) the LOCOST system could calibrate a variety of instrumentation in less than 30 minutes, as JRL claimed, (2) The simplicity of programing and using the system was evident, and (3) the system could produce significant savings at their laboratory.

The Army Metrology and Calibration Center, in response to JRL's October 1979 unsolicited proposal, completed the second evaluation of JRL's LOCOST system in January 1980. The Center also concluded that equipment and programs offered by JRL were not new or unique to the industry nor were they economically competitive with other available automated systems. The Center based its conclusions on the same data used in DARCOM's earlier review. Center officials believed that because of a lack of technical details, JRL's second proposal was not too different from its first proposal. The Center did not contact JRL to determine whether additional capability had been added to the LOCOST system or to ensure that it understood what JRL had to offer. Data provided to us by JRL, for example, shows that the LOCOST system has capability in areas where the Army reported it to be inadequate. Moreover, between the first and second evaluations, problems had surfaced with the five laboratory automated calibration systems which DARCOM had compared with LOCOST. In additon to the problems experienced with the MECCA system, for example, some laboratories were reporting significant problems with the automated calibration system.

The Army's assertion that JRL's LOCOST system is not unique or new to the industry nor state of the art is inconsistent with reports from LOCOST system owners. The reports suggest that the LOCOST system may indeed offer advantages because of shorter programing time and simpler operation. For example, White Sands Missile Range officials report that 100 programs were developed in about 75 hours and that average programer training time was 24 hours. Another LOCOST system owner, an aerospace company, told us that program preparation time on the LOCOST system ranged from 15 minutes to 1 hour with most programs taking 30 minutes or less. This company also told us that it knows of no other commercial off-the-shelf calibrator that will perform as well as the LOCOST system.

Cost evaluation

As previously mentioned, JRL's 1976 and 1979 unsolicited proposals projected significant savings for the Army. JRL based its claimed savings in both proposals on increased productivity and decreased equipment, personnel, and training costs. In evaluating these proposals, however, DARCOM and the Army Metrology and Calibration Center neither agreed with the amounts of JRL savings nor with the concept by which JRL projected those savings. The Center, for example, reported that accepting JRL's 1979 unsolicited proposal could result in a $42 million loss rather than a $200 million savings.

We have been unable to fully evaluate the Center's or JRL's cost analyses because of unreliable workload data and unresolved questions about whether the LOCOST system could replace the manual equipment in mobile vans.

In performing the cost analyses, both JRL and the Center used 1976 estimates of Army workload levels and apparently used 1972 estimates of the major categories of Army test equipment that would require calibration. We have been unsuccessful in obtaining actual current workload data by major categories of Army test equipment because this information is not readily available from Army records.

Also, JRL's 1979 unsolicited proposal assumed that 69 LOCOST systems could replace 50 percent or $100,000 of the manual equipment in each van. In evaluating this proposal, however, the Army assumed that the LOCOST system could not replace any equipment in mobile vans because of a need to retain manual equipment for other calibration and repair operations. Neither JRL nor the Army has validated its assumptions through operational testing of the LOCOST system in a mobile van.

In addition to the above unresolved issues, several other inaccuracies appear in the JRL and Army cost analyses. For example, in the 1979 unsolicited proposal and subsequent Army evaluation:

JRL calculated the cost of each van's equipment, which the LOCOST system would replace, to be $100,000, but an itemized listing of equipment from JRL shows the cost to be about $35,000. The Army said JRL's equipment would not replace any equipment.

The Army elected to delete from JRL's proposal, cost savings attributed to an oscilloscope and a signal generator that JRL had not produced, but it did not reduce the associated lease price for these deleted items from what JRL had originally proposed.

The Army used one workload level to determine the number of LOCOST systems and a different workload level to determine the manual equipment needed.

In both evaluations, the Army said that the LOCOST system was more costly than other automated systems. In the second evaluation, the Army based its conclusion on estimated costs of from $25,000 to $30,000 for the MECCA and $154,000 for a LOCOST system as configured for laboratory use at White Sands Missile Range. According to JRL, a LOCOST system configured for the field Army application would cost less than the LOCOST system at White Sands. The Army, however, has not asked JRL for the purchase price of a LOCOST system configured for field Army application. Both JRL's analyses supporting its unsolicited proposals and the Army's evaluations were based on paper studies.

CONCLUSIONS

Although we are unable to verify the accuracy of all JRL's allegations, we believe that the Army has not adequately considered JRL's LOCOST system, particularly in its evaluation of the system's ability to satisfy field Army calibration program requirements. We could not verify that using JRL's equipment would result in the amount of cost savings as claimed by JRL or that the LOCOST system could satisfy the Army's needs. Before these determinations can be made, the Army needs to completely assess its actual workload and determine what portion of that workload would benefit from automation. The question of whether the LOCOST or other automated systems can replace equipment in field Army vans should be resolved through hardware demonstrations by the people who will use the equipment in carrying out the calibration mission.

RECOMMENDATIONS

We recommend that the Secretary of Defense direct the Secretary of the Army to:

Develop accurate workload data on field Army calibrations because reliable data is needed to validate equipment requirements.

Reexamine equipment capabilities to determine the extent to which automated equipment can replace manual equipment in field Army calibration units.

In addition, we recommend that the Secretary of Defense require that an independent hardware demonstration be conducted to establish the cost effectiveness and productivity increases that may be attributed to automating the field Army calibration functions.

Until the Army has acted on our recommendations, we plan no further work on allegations in JRL's cartoon booklet because we believe such efforts would be unproductive. We are ready to assist you, should you deem it necessary, in monitoring the Army's responses.

During our review, we saw several aspects of the Army Metrology and Calibration Center activities which appear to warrant our further examination. Accordingly, we plan to pursue these matters in a separate review to begin shortly. We will provide you with copies of reports resulting from that effort.

As requested by your Office, we have not taken the time necessary to obtain official comments from either the Army or JRL on the matters discussed in this report. As agreed with your Office, we are sending copies of this report to the Secretary of Defense, the Secretary of the Army, JRL, and interested congressional offices.

Sincerely yours,

MILTON J. SOCOLAR,
Acting Comptroller General
of the United States.

LIST OF CURRENT JULIE PRECISION PRODUCTS

State-of-the-art calibration systems: Turn-key automated calibration and test systems with up to 1ppm accuracy and demonstrated savings of 2 to 3 times over conventional instrumentation.

Precision digital multimeters: Seven models, programmable or manual, 6½ digit precision multimeters for measurement of DC volts, current resistance, ratio. 1ppm resolution, 1ppm accuracy on voltage and resistance ranges. 1EEE interface option available.

Precision voltage dividers: Six models, manual or programmable with linearity of 0.1ppm and accuracy of 1ppm.

Precision high voltage dividers/volt boxes: Ten models for input voltages up to 100KV AC or DC. Accuracy to 0.001%. Stability to 0.001% per year.

Ultra stable voltage references: One model saturated standard cell oven. 1ppm certified accuracy. 1ppm/year stability. Six models solid state zener references with outputs from 10mv to 10v. Stability of 1ppm per day, 25ppm per 6 months.

Precision DC voltage and current sources: Six models programmable and manual. Output ranges ±1.2V to ±1200V, ±1.2ma to ±120 Amp. 7 digit resolution, 1ppm linearity to 2ppm accuracy.

Dialable precision DC voltage sources: Six models, 1ppm resolution, accuracy to ±0.001%. Output Voltage Ranges: ±1; ±10.

Primary standard potentiometers: Two models, DC voltages ranges: 1.2mv to 1000V. Accuracy to 2ppm, resolution to 0.1ppm.

High accuracy AC-DC thermal voltage transfer standard: One model (set), thirteen ranges from 0.5V to 1000V to 100Khz. Accuracy to ±0.003%.

Precision buffer amplifiers and null detectors: Five high-sensitivity models with gain to X1000±1ppm and resolution to 1 nanovolt.

Scanners: Three models programmable or manual low thermal EMF's as low as 0.01 microvolt.

Precision resistance and ratio references: Fourteen models, 0.001 ohms to 1 Megohm, stability to 1ppm/yr, accuracy to .0008%.

Precision resistance measuring system: Three models. Resistance ranges: 0.1 ohms to 100K Megohms, 7 digit resolution, accuracy to 1ppm.

Precision current shunts: Over forty models precision AC and DC current shunts from 1ma to 200 amps. Accuracy to ±0.01%, temperature coefficient less than 5ppm/°C, stability better than ±0.01% per year.

Precision decade resistance boxes: Six models. Total resistance 100 ohms to 1 Megohm. Six decades, to ±.005% accuracy.

Primary standard resistors: Over 64 standard models. 0.1 ohm to 10 Megohm. Accuracy to ±0.001%, stability to ±0.0015% per year.

Ultra stable, precision resistors and resistor networks: Over 10 different styles ultra stable wirewound resistors and networks, temperature coefficients as low as 0.2ppm/°C, accuracy to ±0.001%, for military A/D and D/A network requirements; stabilities to 1ppm for military inertial guidance system applications.

Precision oscillators: Three models, frequency range 1Hz to 1MHz. Frequency Accuracy to 0.1%. Output voltage to 11 volts.

Power and polyphase oscillator: Three models with multiple options. 0.1Hz to 100kHz. Frequency accuracy to 0.1% 50VA output. Amplitude stability to 20ppm. Low distortion. Phase selectable.

Absolute AC voltage and current amplifiers: Ten models programmable and manual, 10 nanovolts to 1000 volts, 1 micro amp to 100 amp, 10Hz to 1.1MHz. Accuracy to 0.02%.

AC power amplifiers: Six models. 25VA to 250VA voltage and/or current regulated. Distortion as low as 0.05%.

Chairman ROTH. You mentioned GAO figures concerning savings, I think roughly $134 or $140 million. The record should be clear that according to a letter to you from Mr. Donald J. Horan, Director, they did want to correct any misrepresentation that would appear that these savings are based on GAO figures. According to this letter, he said, "We purposely did not make any estimate of savings in our April 3, 1981 letter report to Chairman Addabbo, because such estimates are sensitive to the workload and to the distribution of the workload."

I will put that letter in the record.

As I understand it, they are not denying, nor confirming. What they are saying is that the calculations and savings figures are based on information submitted by you.

I think it important for the record to be clear on that point.

[The letter referred to follows:]

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT, LOGISTICS,
AND READINESS DIVISION

JUL 15 1981

Mr. Loebe Julie, President
Julie Research Laboratories, Inc.
211 West 61st Street
New York, NY 10023

Dear Mr. Julie:

As you requested during our June 26, 1981, telephone discussion, I am sending you our working-paper analysis of your mathematical procedure for calculating estimated savings if the field Army used your LOCOST calibration system. First, I would like to correct a misrepresentation that appears on page 24 of your "Book Two" cartoon booklet. The cartoon booklet language implies that a savings of $140 million is GAO's figure when in fact, that figure is yours.

We purposely did not make any estimates of savings in our April 3, 1981, letter report to Chairman Addabbo because such estimates are sensitive to the workload and to the distribution of the workload. One of the key assumptions in your mathematical procedure is that the workload (number of annual calibrations) is distributed equally over all locations. It is not. This uneven workload distribution in the field Army calibration activities precludes us from making any definitive statement of cost savings which might be achieved through the use of your LOCOST calibrators. This is why our report recommended that the Secretary of the Army develop accurate workload data by location on field Army calibrations.

During our visit to your office in January 1981, you gave us the 17 parameters and assumptions you used to calculate your savings estimate. This data is set forth in enclosure I. Assuming LOCOST productivity of 3,500 calibrations a year, the 10-year savings is $162 million, and at 500 calibrations a year, the 10-year loss would be $57 million.

We have obtained some preliminary workload data for 81 of about 150 Army calibration activities as shown in enclosure II. The workload is not distributed evenly. Using the Army's most conservative assumption that your LOCOST equipment could calibrate 31 percent of that workload, our calculations show that out of 81 activities, 6 have over 3,500 calibrations a year and 9 have less than 500 calibrations a year.

Enclosure III, page 1 of 7, is what we term "Baseline" assumptions. We have taken the most conservative Army estimates we were able to obtain at Redstone and adjusted your 17 parameters as follows:

	Parameter	Julie data Jan. 1981	Baseline data July 1981
1.	Workload	560,000	529,244
2.	Manual calibrator productivity	700	621
3.	LOCOST productivity	a/ 500	a/ 500
4.	LOCOST applicability	.30	.31
5.	LOCOST purchase price	$ 80,000	$ 80,000
6.	Van cost	$240,000	$139,652
7.	Manual set cost	$229,000	$364,033
8.	Approximate maintenance cost	.05	.05
9.	Operator hourly cost	$ 16	$ 9.68
10.	Operator attrition	.33	.20
11.	Operator initial training (34 weeks)	$ 14,000	$ 14,474
12.	Operator additional training (16 weeks)	$ 7,000	0
13.	Operator availability	.66	1
14.	Repairmen required per manual set	.5	0
15.	Operators per van	5	5.88
16.	Repair productivity/LOCOST	.1	.1
17.	Manual equipment replaced by LOCOST	$ 40,000	$ 0

a/This parameter starts at 500 and the problem is run in increments of 500 up to 3,500.

Enclosure III, page 1 of 7, manipulates the "Baseline" data using your mathematical procedure and shows a 10-year range from a loss of $41 million to a savings of $65 million.

We then took the "Baseline" data and changed certain parameters to determine the sensitivity of the change. For example, when the "Baseline" workload is changed from 529,244 to 700,000, the 10-year range is from a loss of $55 million to a savings of $85 million. This is shown in enclosure III, page 2 of 7.

Enclosure III, page 3 of 7, takes the same "Baseline" data and changes LOCOST applicability (line 4) from .31 to .42 with the 10-year range from a loss of $50 million to a savings of $94 million. Enclosure III, page 4 of 7, is the result when the attrition rate (line 10) is changed from .20 to .33. Enclosure III, page 5 of 7, is the result when additional training costs (line 12) is changed from 0 to $7,237. Enclosure III, page 6 of 7, is the result when manual equipment replaced by LOCOST (line 17) is changed from 0 to $40,000. When both the workload (line 1) and the LOCOST applicability (line 4) are changed, the result is a 10-year range from a loss of $66 million to a savings of $124 million as shown in enclosure III, page 7 of 7.

In sending you this information, I want to make it clear that it does not represent an official GAO estimate of savings nor does it represent any GAO endorsement of your mathematical procedure. It is merely our internal working papers showing the extent to which your mathematical procedures can result in differing answers depending on the assumptions made.

I am making copies of this letter and the enclosures available to Army and Department of Defense officials so that they may have the benefits and use of this information.

Sincerely yours,

Donald J. Horan

Donald J. Horan
Director

Enclosures - 3

SAVINGS CHECK--JULIE PROPOSAL

This is a computer-generated summary of the worksheet given to GAO auditors during a January 1981 visit to Julie's Plant by Mr. Loebe Julie.

```
      1 WORKLOAD            360000
      2 MANUAL CAL. PRODUCTIVITY 700
      3 LOCOST CAL. PRODUCTIVITY 500
      4 LOCOST APPLICABILITY .3
      5 LOCOST PURCHASE PRICE 80000
      6 VAN COST            240000
      7 MANUAL SET COST    229000
      8 APPRI MAINT. COST .05
      9 OPERATOR HOURLY COST 16
      10 OPERATOR ATTRITION .33
      11 OPERATOR INTITIAL TRAINING (34 WKS) 14000
      12 OPERATOR ADD'L TRAINING (16 WKS) 7000
      13 OPERATOR AVAILABILITY .66
      14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR .5
      15 OPERATORS PER VAN 5
      16 REPAIR PRODUCTIVITY/LOCOST .1
      17 MANUAL EQUIP. REPLACED BY LOCOST 40000

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 360000
UNIT MANUAL SET COST= 343500
UNIT OPERATOR COST/ENLISTMENT= 121848
YEAR CALIBRATION SVC PER ENLISTMENT= 2
UNIT OPERATOR COST= 609242
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 703500

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 800
TOTAL REPAIRMEN REQUIRED= 400
TOTAL OPERATORS REQUIRED= 1200
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 240
TOTAL FACILITY COST= 168840000
TOTAL OPERATOR COST= 731090944
OVERALL COST= 899930944

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 168000

LOCOST        OPERATORS     OPERATORS     FACILITIES     OPERATOR      FACILITIES     EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED         REQUIRED      REQUIRED       SAVINGS       SAVINGS        & MAINT COSTS   SAVINGS

                                                         $$$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$

     500.00      -96.00       1256.00       251.20         -34.12         -7.88          13.07          -57.07
    1000.00       72.00       1088.00       217.60          68.24         15.76          13.06           70.94
    1500.00      128.00       1032.00       206.40         102.35         23.64          12.38          113.61
    2000.00      156.00       1004.00       200.80         119.41         27.58          12.05          134.94
    2500.00      172.80        987.20       197.44         129.65         29.94          11.85          147.74
    3000.00      184.00        976.00       195.20         136.47         31.52          11.71          156.28
    3500.00      192.00        968.00       193.60         141.34         32.64          11.62          162.37
```

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SUMMARY SCHEDULE OF THE DISTRIBUTION OF ARMY CALIBRATION WORKLOAD THAT COULD BE PERFORMED BY JULIE LOCOST

Workload in calibration per year	Activities that could use LOCOST a/	
	Number	Percent
Less than 500	9	11.1
500 - 1,000	20	24.7
1,001 - 1,500	17	21.0
1,501 - 2,000	13	16.1
2,001 - 2,500	9	11.1
2,501 - 3,000	4	4.9
3,001 - 3,500	3	3.7
Over 3,500	6	7.4
Total	81 b/	100.0

GAO Note:

a/This assumes LOCOST could be used for 31 percent of the calibration workload.

b/These are 81 out of 154 activities and have about 80 percent of the total workload.

US Army TMDE Support [illegible]

Source: Army data compiled at Army Metrology Calibration Center, Redstone Arsenal, Alabama.

"BASELINE" ASSUMPTIONS

This is a computer-generated summary worksheet which adjusts Mr. Julie's January 1981 data (enclosure I) to the data GAO obtained from the Army at Redstone in July 1981 and runs the data according to Mr. Julie's mathematical procedures.

```
$$$$$$$$$$$$$$$$$$$$$$$$BASELINE$$$$$$$$$$$$$$$$$$$$$$$

    1 WORKLOAD          529244
    2 MANUAL CAL. PRODUCTIVITY 621
    3 LOCOST CAL. PRODUCTIVITY 500
    4 LOCOST APPLICABILITY .31
    5 LOCOST PURCHASE PRICE 80000
    6 VAN COST          139652 (GAO Note 1)
    7 MANUAL SET COST   364033 (GAO Note 2)
    8 APPRX MAINT. COST .05
    9 OPERATOR HOURLY COST 9.68 (GAO Note 3)
    10 OPERATOR ATTRITION .2
    11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
    12 OPERATOR ADD'L TRAINING (16 WKS) 0
    13 OPERATOR AVAILABILITY 1
    14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
    15 OPERATORS PER VAN 5.88
    16 REPAIR PRODUCTIVITY/LOCOST .1
    17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 115146
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 230292
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 852.245
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 852.245
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 144.94
TOTAL FACILITY COST= 109505832
TOTAL OPERATOR COST= 196265152
OVERALL COST= 305770984

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 164066

LOCOST        OPERATORS   OPERATORS   FACILITIES   OPERATOR   FACILITIES   EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED       REQUIRED    REQUIRED     SAVINGS    SAVINGS      & MAINT COSTS   SAVINGS

                                                   $$$$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$$

     500.00     -63.94      916.15      155.81      -14.72       -8.22          18.70         -41.64
    1000.00     100.13      752.11      127.91       23.06       12.87          15.35          20.58
    1500.00     154.82      697.43      118.61       35.65       19.89          14.23          41.31
z   2000.00     182.16      670.08      113.96       41.95       23.41          13.68          51.68
    2500.00     198.57      653.68      111.17       45.73       25.51          13.34          57.90
    3000.00     209.51      642.74      109.31       48.25       26.92          13.12          62.05
    3500.00     217.32      634.92      107.98       50.05       27.92          12.96          65.01
```

GAO Notes

1. Weighted average of both commercial and tactical vans.
2. Weighted average of both AN/GSM-286 and AN/GSM-287.
3. Weighted average of both civilian and military personnel.

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This is a computer-generated summary worksheet which runs the "Baseline" assumptions (enclosure III) changing workload level (line 1) from 529,244 to 700,000.

```
    1 WORKLOAD          700000
    2 MANUAL CAL. PRODUCTIVITY 621
    3 LOCOST CAL. PRODUCTIVITY 500
    4 LOCOST APPLICABILITY .31
    5 LOCOST PURCHASE PRICE 80000
    6 VAN COST          139652
    7 MANUAL SET COST   364033
    8 APPRX MAINT. COST .05
    9 OPERATOR HOURLY COST 9.68
    10 OPERATOR ATTRITION .2
    11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
    12 OPERATOR ADD'L TRAINING (16 WKS) 0
    13 OPERATOR AVAILABILITY 1
    14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
    15 OPERATORS PER VAN 5.88
    16 REPAIR PRODUCTIVITY/LOCOST .1
    17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 115146
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 230292
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 1127.21
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 1127.21
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 191.703
TOTAL FACILITY COST= 144836944
TOTAL OPERATOR COST= 259588400
OVERALL COST= 404425344

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 217000

LOCOST        OPERATORS     OPERATORS     FACILITIES    OPERATOR      FACILITIES    EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED         REQUIRED      REQUIRED      SAVINGS       SAVINGS       & MAINT COSTS   SAVINGS

                                                        $$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$

     500.00       -84.56     1211.78       206.08        -19.47        -10.87          24.73           -55.07
    1000.00       132.44      994.78       169.18         30.50         17.02          20.30            27.21
    1500.00       204.77      922.44       156.88         47.16         26.31          18.83            54.64
    2000.00       240.94      886.28       150.73         55.49         30.96          18.09            68.36
    2500.00       262.64      864.58       147.04         60.48         33.75          17.64            76.59
    3000.00       277.10      850.11       144.56         63.81         35.61          17.35            82.07
    3500.00       287.44      839.78       142.82         66.19         36.93          17.14            85.99
```

This is a computer-generated summary worksheet which runs the "Baseline" assumptions (enclosure III) with the following changes:

```
This shows the results from a change in the 'LOCOST applicability rate' from 31 to 42 percent.

     1 WORKLOAD          529244
     2 MANUAL CAL. PRODUCTIVITY 621
     3 LOCOST CAL. PRODUCTIVITY 500
     4 LOCOST APPLICABILITY .42
     5 LOCOST PURCHASE PRICE 80000
     6 VAN COST          139652
     7 MANUAL SET COST   364033
     8 APPRI MAINT. COST .05
     9 OPERATOR HOURLY COST 9.68
     10 OPERATOR ATTRITION .2
     11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
     12 OPERATOR ADD'L TRAINING (16 WKS) 0
     13 OPERATOR AVAILABILITY 1
     14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
     15 OPERATORS PER VAN 5.88
     16 REPAIR PRODUCTIVITY/LOCOST .1
     17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 115146
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 230292
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 852.245
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 852.245
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 144.94
TOTAL FACILITY COST= 109505832
TOTAL OPERATOR COST= 196265152
OVERALL COST= 305770984

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 222282

LOCOST        OPERATORS      OPERATORS      FACILITIES     OPERATOR       FACILITIES     EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED          REQUIRED       REQUIRED       SAVINGS        SAVINGS        & MAINT COSTS   SAVINGS

                                                           $$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$

     500.00       -86.62         938.87         159.67         -19.95         -11.13          19.16          -50.24
    1000.00       135.66         716.58         121.87          31.24          17.43          14.62           34.05
    1500.00       209.75         642.49         109.27          48.30          26.95          13.11           62.14
    2000.00       246.80         605.44         102.97          56.84          31.71          12.36           76.19
    2500.00       269.03         583.22          99.19          61.96          34.57          11.90           84.62
    3000.00       283.85         568.40          96.67          65.37          36.47          11.60           90.24
    3500.00       294.43         557.81          94.87          67.81          37.83          11.38           94.25
```

This is a computer-generated summary worksheet which runs the "Baseline" assumptions (Enclosure III) with the following changes:

```
This shows the results from a change in the attrition rate from 20 to 33 percent.

     1 WORKLOAD          529244
     2 MANUAL CAL. PRODUCTIVITY 621
     3 LOCOST CAL. PRODUCTIVITY 500
     4 LOCOST APPLICABILITY .31
     5 LOCOST PURCHASE PRICE 80000
     6 VAN COST          139652
     7 MANUAL SET COST   364033
     8 APPRX MAINT. COST .05
     9 OPERATOR HOURLY COST 9.68
     10 OPERATOR ATTRITION .33
     11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
     12 OPERATOR ADD'L TRAINING (16 WKS) 0
     13 OPERATOR AVAILABILITY 1
     14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
     15 OPERATORS PER VAN 5.88
     16 REPAIR PRODUCTIVITY/LOCOST .1
     17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 75487.3
YEAR CALIBRATION SVC PER ENLISTMENT= 3.0303
UNIT OPERATOR COST= 249108
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 852.245
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 852.245
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 144.94
TOTAL FACILITY COST= 109505832
TOTAL OPERATOR COST= 212301152
OVERALL COST= 321806984

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 164066

LOCOST        OPERATORS     OPERATORS     FACILITIES    OPERATOR      FACILITIES    EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED         REQUIRED      REQUIRED      SAVINGS       SAVINGS       & MAINT COSTS   SAVINGS

                                                        $$$$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$

      500.00     -63.94        916.18        155.61        -15.93         -8.22          18.70          -42.84
     1000.00     100.13        752.11        127.91         24.94         12.87          15.35           22.46
     1500.00     154.82        697.43        118.61         38.57         19.89          14.23           44.23
     2000.00     182.16        670.08        113.96         45.38         23.41          13.68           55.11
     2500.00     198.57        653.68        111.17         49.47         25.31          13.34           61.64
     3000.00     209.51        642.74        109.31         52.19         26.92          13.12           65.99
     3500.00     217.32        634.92        107.98         54.14         27.92          12.96           69.10
```

This is a computer-generated summary worksheet which runs the "Baseline" assumptions (enclosure III) with the following changes:

```
This shows the results of changing the 'Additional training costs' from 0 to $7237.

      1 WORKLOAD          329244
      2 MANUAL CAL. PRODUCTIVITY 621
      3 LOCOST CAL. PRODUCTIVITY 500
      4 LOCOST APPLICABILITY .31
      5 LOCOST PURCHASE PRICE 80000
      6 VAN COST          139652
      7 MANUAL SET COST   364033
      8 APPRX MAINT. COST .05
      9 OPERATOR HOURLY COST 9.68
      10 OPERATOR ATTRITION .2
      11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
      12 OPERATOR ADD'L TRAINING (16 WKS) 7237
      13 OPERATOR AVAILABILITY 1
      14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
      15 OPERATORS PER VAN 5.88
      16 REPAIR PRODUCTIVITY/LOCOST .1
      17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 122383
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 244766
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 852.245
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 852.245
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 144.94
TOTAL FACILITY COST= 109505832
TOTAL OPERATOR COST= 208600544
OVERALL COST= 318106376

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 164066

LOCOST        OPERATORS      OPERATORS      FACILITIES     OPERATOR       FACILITIES      EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED          REQUIRED       REQUIRED       SAVINGS        SAVINGS         & MAINT COSTS   SAVINGS

                                                           $$$$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$$$

       500.00       -63.94         916.18         153.81         -15.65          -8.22           18.70          -42.56
      1000.00       100.13         752.11         127.91          24.51          12.87           15.35           22.03
      1500.00       154.82         697.43         118.61          37.89          19.89           14.23           43.53
x4    2000.00       182.16         670.08         113.96          44.59          23.41           13.68           54.32
      2500.00       198.37         653.68         111.17          48.60          25.51           13.34           60.78
      3000.00       209.51         642.74         109.31          51.28          26.92           13.12           65.08
      3500.00       217.32         634.92         107.98          53.19          27.92           12.96           68.16
```

This is a computer-generated summary worksheet which runs the "Baseline" assumptions (enclosure III) with the following changes:

```
This shows the results from a change in the 'Manual equipment replaced by LOCOST' from $.00 to $40,000.

     1 WORKLOAD          529244
     2 MANUAL CAL. PRODUCTIVITY 621
     3 LOCOST CAL. PRODUCTIVITY 500
     4 LOCOST APPLICABILITY .31
     5 LOCOST PURCHASE PRICE 80000
     6 VAN COST          139652
     7 MANUAL SET COST   364033
     8 APPRX MAINT. COST .05
     9 OPERATOR HOURLY COST 9.68
     10 OPERATOR ATTRITION .2
     11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
     12 OPERATOR ADD'L TRAINING (16 WKS) 0
     13 OPERATOR AVAILABILITY 1
     14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
     15 OPERATORS PER VAN 5.88
     16 REPAIR PRODUCTIVITY/LOCOST .1
     17 MANUAL EQUIP. REPLACED BY LOCOST 40000

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 115146
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 230292
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 852.245
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 852.245
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 144.94
TOTAL FACILITY COST= 109505832
TOTAL OPERATOR COST= 196265152
OVERALL COST= 305770984

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 164066

LOCOST        OPERATORS     OPERATORS     FACILITIES    OPERATOR      FACILITIES    EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY  SAVED         REQUIRED      REQUIRED      SAVINGS       SAVINGS       & MAINT COSTS   SAVINGS

                                                        $$$$$$$$$$$$$$$$$$$$$$in millions$$$$$$$$$$$$$$$$$$$$$$$$

    500.00       -63.94        916.18        155.81        -14.72         -8.22          9.33          -32.29
   1000.00       100.13        752.11        127.91         23.06         12.87          7.67           28.25
   1500.00       154.82        697.43        118.61         35.65         19.89          7.12           48.43
   2000.00       182.16        670.08        113.96         41.95         23.41          6.84           58.52
   2500.00       198.57        653.68        111.17         45.73         25.51          6.67           64.57
   3000.00       209.31        642.74        109.31         48.25         26.92          6.56           68.61
   3500.00       217.32        634.92        107.98         50.05         27.92          6.48           71.49
```

This is a computer-generated summary worksheet which runs the "Baseline" assumptions (enclosure III) with the following changes:

```
This following shows the results from a change in the workload level from 529244 to 700000 actions annually and a change in the LOCO
ST applicability rate from 31 to 42 percent.

     1 WORKLOAD          700000
     2 MANUAL CAL. PRODUCTIVITY 621
     3 LOCOST CAL. PRODUCTIVITY 500
     4 LOCOST APPLICABILITY .42
     5 LOCOST PURCHASE PRICE 80000
     6 VAN COST          139652
     7 MANUAL SET COST   364033
     8 APPRI MAINT. COST .05
     9 OPERATOR HOURLY COST 9.68
     10 OPERATOR ATTRITION .2
     11 OPERATOR INTITIAL TRAINING (34 WKS) 14474
     12 OPERATOR ADD'L TRAINING (16 WKS) 0
     13 OPERATOR AVAILABILITY 1
     14 REPAIRMEN REQ'D/PER MANUAL CALIBRATOR 0
     15 OPERATORS PER VAN 5.88
     16 REPAIR PRODUCTIVITY/LOCOST .1
     17 MANUAL EQUIP. REPLACED BY LOCOST 0

CALCULATION OF 10 YEAR UNIT COST
UNIT VAN COST= 209478
UNIT MANUAL SET COST= 546050
UNIT OPERATOR COST/ENLISTMENT= 115146
YEAR CALIBRATION SVC PER ENLISTMENT= 5
UNIT OPERATOR COST= 230292
UNIT LOCOST SYSTEM COST= 120000
UNIT FACILITY (VAN & MAN SET) COST= 755528

CALCULATION OF WITHOUT LOCOST (10 YR TOTAL COST)
TOTAL CALIBRATORS REQUIRED= 1127.21
TOTAL REPAIRMEN REQUIRED= 0
TOTAL OPERATORS REQUIRED= 1127.21
TOTAL FACILITIES REQUIRED (VANS & MAN SETS)= 191.703
TOTAL FACILITY COST= 144836944
TOTAL OPERATOR COST= 259588400
OVERALL COST= 404425344

CALCULATION OF WITH LOCOST PROPOSAL (10 YR SAVINGS)
LOCOST WORKLOAD= 294000

LOCOST         OPERATORS      OPERATORS      FACILITIES     OPERATOR       FACILITIES     EXCESS HARDWARE OVERALL LOCOST
PRODUCTIVITY   SAVED          REQUIRED       REQUIRED       SAVINGS        SAVINGS        & MAINT COSTS   SAVINGS

                                                            ########################in millions########################

      500.00     -114.57        1241.78        211.19          -26.38         -14.72          25.34          -66.45
     1000.00      179.43         947.78        161.19           41.32          23.06          19.34           45.03
     1500.00      277.43         849.78        144.52           63.89          35.65          17.34           82.19
     2000.00      326.43         800.78        136.19           75.17          41.94          16.34          100.77
     2500.00      355.83         771.38        131.19           81.94          45.72          15.74          111.92
     3000.00      375.43         751.78        127.85           86.46          48.24          15.34          119.36
     3500.00      389.43         737.78        125.47           89.68          50.04          15.04          124.66
```

Chairman ROTH. Has GAO or the Army or anyone else challenged your figures?

Mr. JULIE. Well, the GAO investigators spent 2 days in my plant going over every page of the green book, Book I, which included the savings statements and I actually went through with them in great detail the complete savings calculation. They never came back and said the method of the calculation was wrong, although I think they would by this time have found any errors. And I think in that 2-day period we covered all of the items in the green book, including savings.

Chairman ROTH. I understand that the Army is claiming that your equipment doesn't meet its need, particularly in the field. Is the JRL system adaptable to field need, in your opinion?

Is it mobile equipment? How does it compare in size to your competitor?

Mr. JULIE. The JRL equipment is actually smaller in size and more mobile than the equipment the Army is now using. We also went over this in great detail with the GAO investigators and the IG investigators who have corroborated that our statement is correct.

Chairman ROTH. One of the charges is that your equipment may be too complex for the needs of the Army. How does it compare with your competitors with respect to training new personnel? Is it useful in the field?

Mr. JULIE. That is a good question to which I think the WSMR data supplies the answer. It would only take 80 hours to train a man to operate our system. It would take 1,600 hours to train him to operate the Army's manual equipment. Our system is designed to be much simpler to use and to learn to use.

Chairman ROTH. Your claim is that it is simpler to train personnel on. How about manpower to perform the job in the field? Would it require more personnel or less than your competitor's product?

Mr. JULIE. Our system requires one man to do the job that now requires five men with the equipment the Army is buying. It is substantially simpler to operate and requires substantially less manpower.

Chairman ROTH. Are you claiming that it would replace all manual requirements or is it just useful for part of the Army's needs?

Mr. JULIE. The Army has been buying manual equipment since 1961. It stopped buying manual equipment in 1974 and started buying automated equipment from Hewlett-Packard and Fluke. The failure of that automated equipment caused it to go back again and buy the same manual equipment it ordered in 1961.

Our equipment is unusual in that it can be operated either as manual or as automated equipment and, therefore, and in the same space where the Army has exclusively manual equipment, with our equipment they could operate either manually or automatic.

Chairman ROTH. Mr. Julie, has the Army ever specifically told you that your equipment simply will not work as effectively as you claimed it would?

Mr. JULIE. Would not work effectively?

Chairman ROTH. Would not work as effectively as you claimed it would?

Mr. JULIE. These are some of the allegations that were made in 1974. They said our equipment was too small to do the job and would not be effective. However, since that time they have also said that the same equipment would be too large to do the job and is too effective.

Chairman ROTH. One of our concerns, as members of this committee, is not only your specific problem, but how typical is this of the kind of problem faced by other small businesses? Are you familiar with other such circumstances of other small businessmen, either medium or large, who have indicated similar problems?

Mr. JULIE. Yes.

In 1975, when I was just starting my battle with the Army, I thought my problem was unique, but I also had the thought that perhaps it was systemic. I made an effort to contact other small companies and found that it was so totally systemic that I set up an organization called the Tier II Committee on DOD Procurement to try to do something about it. I have a file of letters from small companies like my own, all saying the same thing—"We agree this is the problem. It has happened to us. Most of us have given up and have stopped trying to sell to the Government completely. We are going into some other business." I will be glad to make that file available to the committee.

That committee was discontinued because I lacked the time and funds to support it. But we have recently organized another committee on the same subject, the Committee Against Waste and Abuse in Government Procurement, because we feel this problem is so widespread and important that someone besides the Army and the Government has got to do something about it. Our committee is a nonprofit corporation designed to attack this problem on a broad basis for a large number of companies.

Chairman ROTH. I will ask our staff, majority and minority with the approval of the ranking member, to review with you that file.

Aside from the test made at White Sands, has the Army ever tested your equipment in the field? Are you willing to configure your equipment to fit the field requirements of the Army?

Mr. JULIE. I would say yes, we are. An interesting comment, though, is that we offered some of our equipment as part of the Army solicitation in July of this year and the Army Engineers accepted that equipment for their field application. There does not seem to be any reason why our equipment does not fit their application.

Chairman ROTH. My time is up.

Senator Eagleton.

Senator EAGLETON. Mr. Julie, to what extent, in your judgment, was your presentation to the Army damaged or in any way impeded by your two big business competitors, Hewlett-Packard and Fluke?

Mr. JULIE. I don't think that it was damaged. I think that the prevailing tendency in the Army and in the Government from the early 1970's, has been to give its business to those two large companies. I don't know whether those companies made any effort to interfere with Julie Research Laboratories.

Senator EAGLETON. Do you have any ex-military officers on your payroll?

Mr. JULIE. No, I do not, Senator.

Senator EAGLETON. Do you know if a sizable number of ex-military officers are on the payroll of Hewlett-Packard?

Mr. JULIE. I really have no personal knowledge.

Senator EAGLETON. I think it is generally known, and I think there have been some studies—I don't have one handy—that career military officers, especially in the procurement and R. & D. area, when they retire from the military, are absorbed by the major defense contractors throughout the United States. Doesn't the fact that a number of career military men retire into big defense businesses give those big companies unique access to the entire defense procurement process while a small company, such as yourself, without such access is disadvantaged?

Mr. JULIE. I'm afraid it does, Senator Eagleton, and I think that is an important part of the problem. Maybe that is what the Army refers to as a nonaggressive demeanor. Perhaps with that kind of interface you are nonaggressive.

Senator EAGLETON. You don't have to be very aggressive if Colonel X comes to defense contractor A and his previous deputy then gets promoted in a procurement position, and he is just a telephone call away. You don't have to shout or scream or in any way intimidate.

Mr. JULIE. I agree.

Senator EAGLETON. Access is the key to the entire governmental process. It also applies here to Congress as well. Some individuals, because they are significant campaign contributors, or because they are "significant people," can call up and talk to a Senator and get their point of view across because they are "significant individuals," but someone with a less prestigious name from a less prestigious company does not have that access. There will be a lot of lessons to be learned from your case history that is evolving here this morning, but it is one of literally tens of thousands of cases where an individual who does not come from a Fortune 500 company does not get the kind of attention or response that the big company does.

I am not denouncing Mr. Packard. I think on balance he was a very good Deputy Secretary of Defense under President Nixon.

Mel Laird was his boss, so to speak, and I think Packard did a very fine job. But the access that Hewlett-Packard has to DOD at every level of the entity puts a small company like yours at an absolutely incredible disadvantage. I don't know how to remedy that. I don't know how to legislate or remedy by regulation the inequality of access. It troubles me greatly. But I have no utopian cure for it.

One other question: Comment, if you will, on the scope and completeness and accuracy of the GAO analysis of this situation. You realize, of course, that GAO is our investigative arm. We are heavily dependent upon it, although we have different members of our staff that are assigned certain legislative areas to cover, we do not have within our own offices a full investigative team and, hence, we utilize GAO as our research entity, our investigating entity, our analytical entity.

Would you care to evaluate for us—and this committee has jurisdiction over the GAO—would you evalute for us the thoroughness, accuracy, and quality of the GAO report?

Mr. JULIE. I would. Actually, let me subdivide my answer. Our GAO experience is with two Divisions of the GAO, the Protest Division and the Audit Division. The favorable data came as a result of a 9-month investigation by the Audit Division of the GAO. I will return to that Division after discussing the other Division of the GAO, which is the Protest Division.

My experience, which dovetails with the experience of all of the other small companies that I have talked to and some of the large companies, is that the protest adjudication function of the GAO is an absolute disaster. In my own case, this problem could have been solved by a fair decision on the part of the GAO Protest Division in 1975. Instead of that, they merely rubberstamped the Army's position and the problem had to continue.

As recently as this year, at the same time the GAO Audit Division was finding that the Army was inconsistent, evasive, less than candid, and so on, the GAO Protest Division was saying, "We find absolutely nothing wrong with the Army's behavior."

Probably the first target for our new Committee Against Waste and Abuse in Government Procurement will be to try to change the impartial procurement adjudication process in the Government because there isn't any. We know that trillions of dollars will be spent on Government procurement over a few years.

We know that there are many regulations controlling this procurement and that they are being constantly corrected and revised at great expense of time and money. But they are regularly flouted because there is no fair or proper adjudication process. The GAO Protest Division is merely a rubberstamp for the abuses of the various Government agencies. That has to be changed, or else the whole procurement system doesn't make any sense.

So much for that Division. The GAO Audit Division, I think, tries to do a fair and independent job. I think they may need a shot in the arm. I think they are a little intimidated by the Army and a little cautious in making their statements, but at least I think they do a fair job.

Senator EAGLETON. I think that evaluation is very important. I share your notion that GAO is sometimes intimidated by the Pentagon. I have had experience with a couple of weapons systems in previous years when the career trained GAO people with expertise in the field felt very strongly about a certain weapons system but then when it got down to a showdown between the GAO and the Pentagon, the higher echelon of the GAO didn't want to go to the brink of confrontation with the Pentagon. The Pentagon is so overwhelming in its staggering numbers. You ought to be here some morning around 9 o'clock when an admiral or general is going to come up and testify. They swing around to the back end of this building and a flotilla comes in, seven or eight cars, the admiral sitting in with a couple of captains and lieutenants to open the door for him. And then, on the other hand, the GAO will send up one expert. And it is the testimony of the one GAO expert versus the flotilla and it is staggering. That is part of the clout of the Pentagon. They overwhelm you with gold stripes and numbers, not always with wisdom—but always with numbers.

And I don't know how to rectify that. They just have more flotillas. And the Protest Division of the GAO, I think, is a very important facet of this, Mr. Chairman, that may require further attention by this committee.

If there is no effective place to which an individual can take his complaint or his problem, and if everything goes in the wastebasket, or is rubberstamped, then having a Protest Division is purely cosmetic. So when the smoke clears from this immediate hearing, perhaps we ought to give reflective thought as to whether we really have a viable structure wherein an aggrieved individual can take his complaint to have it fairly and independently evaluated.

Chairman ROTH. I would agree with that, Senator Eagleton, and I would also like to say that when your new nonprofit group comes up with some recommendations in the adjudication area, this committee would be very much interested in learning what you feel is appropriate.

Mr. JULIE. We will be glad to cooperate with the committee.

Chairman ROTH. Senator Rudman?

Senator RUDMAN. Thank you, Mr. Chairman.

Mr. Julie, what I would like to do in the few moments I have is to try to get into, if you will, the anatomy of how this entire stonewalling took place. I believe a fair reading of the IG's report indicates this is exactly what happened. I don't blame senior officials in the Army. I don't think it is an institutional bias. It is illustrative of what can happen.

One particular area of this report, which I will read very briefly, simply says this:

> Some of this inconsistency appears to have been inadvertent in that senior officials, seeking quick information from their technical experts, were not fully informed. The senior officials were sometimes more reassured than advised.

Now obviously you are, to put it politely, a pain-in-the-neck to a lot of people. So I expect anytime a senior official could get information that tended to support the Army's position, that would be more readily accepted than searched out and I want to get into some details with you.

When you separate the wheat from the chaff, the central issue that I think really kept you from winning this case a long time ago was the charge that your equipment, in fact, although extremely good, technically advanced, automated in function, reprogramable as opposed to rigid or fixed, could not, in fact, handle a large percentage of the inventory of the equipment that had to be tested. I would like you to respond to that here in this hearing because I have heard that as recently as 2 weeks ago.

Mr. JULIE. Well, this entire 7-year history, mine, and the history of other small companies, shows that the Army is guilty of applying a double-standard to small and large companies.

If you compare our system to the Hewlett-Packard and John Fluke systems that the Army bought in quantity, sole source, you will find that they did not use that argument when they procured those systems. Yet our system calibrates the largest single chunk of the Army's total workload. It is at least one-third of their total workload and it is the biggest single piece. The Army's workload includes physical things like gauges and micrometers. Julie and Hewlett-Packard and John Fluke don't calibrate gauges and micrometers. That is a 32 percent piece none of us calibrate. The Army's workload includes microwave. The Julie and HP and Fluke systems that the Army purchased at this time did not include microwave, so you take off that piece.

A third of the Army's workload is a very big single piece, and that is what Julie calibrates and it calibrates it, as we saw from some of the data, either two to three times better than anybody else, which was the statement in the original White Sands report, or 10 to 20 times better than anyone else, if you really look at the numbers in detail.

Senator RUDMAN. Let me interrupt at that point, then. So the answer to that question is that to the extent that there was a portion of the Army's workload that in fact was not testable by Fluke and Hewlett-Packard equipment, that applied across the board?

Mr. JULIE. Exactly.

Senator RUDMAN. So that was an unfair standard by which to report to their superiors, without mentioning that key fact?

Mr. JULIE. Yes.

Senator RUDMAN. The second point—the other charge that has been made is that your equipment was so complex that it was excellent if you had, let's say, 50 meters that you were going to calibrate; but for those manual calibrations that might be done on only 1 or 2 meters in the field, the investment of time in programing was such that they really needed a manual system. I would like you to respond to that on the specific question as to whether or not your automated equipment could be converted to a manual mode and, in fact, you could test the manual equipment in small quantities in precisely the same way, and at a more rapid rate.

Mr. JULIE. To answer the second part of your question, first, yes, our equipment can be operated in a manual mode and can calibrate, let's say, at the same rate as the manual equipment that the Army buys. The answer to your first question is that with a small workload, the smallest workload you can have is one piece, the manual system would take a minimum of 12 hours to program to calibrate one-piece plus an additional 2 or 2½ hours to do the actual calibration. So the smallest possible workload would take 14 or 14½ hours on the manual equipment the Army now buys.

On the Julie equipment, the programing time for the same one-piece workload is 0.8 hours and the testing time is 0.4 hours, a total of 1.2 hours would be required instead of 14 hours. All of these numbers are from White Sands data.

Senator RUDMAN. Then, of course, it follows that if there were 100 of those items to test, then the total time saved would be enormous according to your figures.

Mr. JULIE. Exactly.

Senator RUDMAN. Mr. Julie, in the few moments I have remaining, I don't know what will be done or can be done to help your company out of the extreme position it is in and as Chairman Roth has pointed out, that is truly not the purpose of this hearing, but if, in fact, your testimony is accurate, and I believe that it is, it is a damning accusation against a state of readiness in certain classified areas where calibration is absolutely essential if we are going to hit targets that we are talking about and if we are going to use radar systems as they are intended.

What could the Secretary of the Army do today to cut through all of the haze and all of the blur; what kind of a test do you think would be the most direct illustrative test of your equipment against its competitors that a small group of nonpartisan, unbiased experts could look at and advise the Secretary? How could that be done?

Mr. **Julie**. Well, I think we have to be aware of the double standard again, Senator. The Julie system has already been tested at places like Grumman Aerospace, at places like GE Space Center, places like Newport News Shipyard, and the Army's own White Sands Missile Range Laboratory. According to the information given to Congressman Addabbo the Army has, perhaps, 40 fixed calibration laboratories like the White Sands Missile Range, not mobile laboratories, but fixed. They calibrate devices that are similar to the ones calibrated at White Sands Missile Range. They could immediately profit as a result of the test that has already been completed at White Sands Missile Range by adopting the Julie system.

That takes care of 40 places in the Army where they could use the advantages of the Julie system without any further tests.

As for the roughly 150 mobile vans in the Army, as I understand it, the Army has now gone through an agonizing reappraisal and is now planning to take the wheels off its mobile vans and go back to a fixed mode of operation. That means that the Army probably will have even more laboratories that could profit from the test that has already been carried out by White Sands in a fixed environment.

For the remaining laboratories on wheels, the Army purchased the Fluke system, which is larger than the Julie system, without any agonizing over its applicability. It purchased the Fluke system out of hand for the mobile van application. It did the same thing with the very large Hewlett-Packard system without agonizing and without testing.

I think that the White Sands data is applicable to the testing not only in fixed laboratories but also in the vans and that the Army could equip as many vans as they like with Julie equipment with a great deal of confidence. If they want to do it on a limited basis, they have the habit of buying from the Fluke Co., for example, in quantities of 20, they could equip 20 mobile vans with the Julie system and run a test that way.

Senator **Rudman**. Finally, Mr. Julie, what foreign countries have tried to buy your equipment and what has your response been?

Mr. **Julie**. Well, probably the most important one was the Soviet Union. This took place back in 1977 when we were struggling desperately to convince the Army. They offered to buy our equipment, give us an order. I declined the order.

Senator **Rudman**. Would that have been exportable—exempted from prohibition?

Mr. **Julie**. Yes, I was invited to visit the Soviet Union and discovered both of our competitors, the large companies, Hewlett-Packard and Fluke Co. were selling very actively and aggressively to the Soviet Union. It would have been possible.

Senator **Rudman**. Why did you not choose to sell your equipment considering the financial condition your company is in?

Mr. **Julie**. I am not a good businessman, Senator. I started developing technology at the end of World War II. I remember the sale of steel to the Japanese. I felt calibration technology is too critically important to let the Soviets have.

Senator **Rudman**. Thank you very much.

Chairman **Roth**. Mr. Julie, I only have two or three more questions that I would like to ask you. One is, have you attempted to sell your equipment to any of the other services, such as the Army, Navy—rather Navy, Air Force, or to any other Government agencies? If not, why not?

Mr. **Julie**. The problem in the Navy and the Air Force is similar to the problem in the Army. That is, procurements tend to be restrictive. The Air Force's procurements have been sole source to the Hewlett-Packard Co. and the John Fluke Co. over the same period. We didn't see that a small company like ours could wage a war against the two services at the same time so we focused on the Army.

Chairman **Roth**. Going back to a question that Senator Rudman raised, frankly, I am concerned about the use of sole source. We are interested in developing, as you indicated, more than one source. So I go back to the question Senator Rudman raised with you, that the job of this committee is not to try to instruct the military or the Government from whom to procure, but to try to insure we have adequate sources, that the procedures we follow are fair to all concerned.

So I would like to ask you again the question Senator Rudman raised, beyond selling on a sole source basis, what could be done, in your judgment, that would give you a fair chance?

Mr. **Julie**. Well, I know in mobilization base cases, other ones involving large companies like the Lockheed Co., actions were taken to perpetuate Lockheed as part of the U.S. mobilization base. I am not sure what those were. My company has never really asked for a handout. We have merely asked for an opportunity to supply our equipment to the Government where the facts obviously justified its application and its legitimate procurement on a sole source basis.

I am not opposed to sole source procurement. I am opposed to illegitimate sole source procurement.

Chairman **Roth**. The problem is often in the eyes of the beholder.

Mr. **Julie**. I agree, except we now have a fairly substantial data base showing that the procurements of Hewlett-Packard systems and John Fluke systems have been ineffective, that the performance of those systems is substantially lower than the Julie performance and if the Army essentially bought on a performance basis, we would end up as a sole source, in effect.

Chairman **Roth**. My final question is, do you have any actual evidence that there was any improper conduct on the part of anyone in violation of the conflict of laws, gifts, or anything else that influenced these procurements?

Mr. **Julie**. The information I have is essentially information obtained from Freedom of Information sources and doesn't delve into such areas. I have noted in the Inspector General's report the indication that some punitive action will be taken against the Army individuals. I think that is based on the Inspector General's findings. I can supply no data on that.

Chairman ROTH. Mr. Julie, I want to compliment you for your aggressiveness. Frankly, I find you very delightful. I am not sure if this is a good example of your performance or not. It has been my experience that many times the most inventive, innovative people have the most remarkable personalities. As I said earlier, I strongly condemn any effort to put procurement on the basis of the old boy system or to say that your marketing techniques, as long as they are legal, to have anything to do with who has the award. I appreciate your being here today.

I do, again, want to underscore our job is not to decide who supplies but to assure the system is fair. I think you have been very helpful.

Mr. JULIE. I express my thanks, Senator Roth.

Senator RUDMAN. Let me say, Mr. Chairman, before Mr. Julie leaves the witness chair that I had an opportunity to meet with him at length in my office over the past winter and I, too, find him a delightful and refreshing individual, illustrative of that which I think is best about the free enterprise system. But in a real sense, Mr. Chairman, although this is not the purpose of this hearing, I find this hearing tragic, this morning, very tragic, because it may well be that our own Government has helped to take someone who is innovative, hard working, and patriotic, and essentially put them in a position where they will go out of business.

I for one don't intend to let the matter drop after this hearing. This committee has many other things to do, but I intend to follow this one very, very closely because I believe that some people ought to be held accountable for what happened to Loebe Julie. I appreciate you being here this morning very much.

Mr. JULIE. Thank you, sir.

Chairman ROTH. Thank you, Mr. Julie.

[Mr. Julie's prepared statement and responses to written questions submitted by Senator Jackson follow:]

STATEMENT OF LOEBE JULIE

PRESIDENT JULIE RESEARCH LABORATORIES, INC.

before the SENATE COMMITTEE ON GOVERNMENT AFFAIRS

November 5, 1981

Mr. Chairman and Members of the Committee:

I have spent most of my life preparing for this hearing on defense procurement problems. My work for the past forty years has consisted primarily of the development of better technology directly related to the advancement of U.S. industrial and defense leadership. Some of the new computer technology I created in the early 1940's helped give the U.S. a defense advantage in World War II. Throughout the entire 40 year period, my work has helped establish U.S. leadership in missile systems, fire control systems, inertial navigation systems, test and calibration systems and measurement standards.

Calibration (from caliber-- the diameter of the bore of a cannon, gun, etc.) refers to the critically important process of testing, measuring, monitoring, adjusting and controlling almost everything society produces and uses. In the context of this hearing, which refers to the procurement and effectiveness of Army calibration equipment, the proper performance of all Army materiel--guns, tanks, planes,navigation systems, guidance systems, fire control systems, radar, avionics, etc.--depends on the accurate and continuous test and adjustment of this materiel, both in the laboratory and the field. It is estimated that the Army owns and uses 1 million pieces of commercial grade test equipment (Test, Measurement, and Diagnostic Equipment or TMDE) for these important operations.

What tests this one million testers? Higher performance calibration grade test equipment (i.e.-calibrators) which are typically 4 to 10 times better in performance than commercial grade equipment in accuracy, range, resolution, sensitivity and reliability. It is estimated that the Army spends

$50 million per year on calibration, which is critically important to the proper working all Army test equipment, which is in turn critically important to the proper working of all Army materiel and weapons.

I founded my own company, Julie Research Laboratories, 27 years ago because of essential lack of interest on the part of larger U.S. companies in developing improved technology for computer and fire control systems. Almost immediately the problem of more accurate measurement and calibration reared its head - the U.S. Navy needed more accurate airborne inertial navigation systems and components as well as more accurate test and calibration equipment for the new U.S. Polaris missile system. Since neither large industry nor large government (the U.S. National Bureau of Standards) responded to the need, JRL began to redirect its efforts to supplying the new Polaris requirement. It was quickly obvious that more accurate measurement and calibration was not only necessary in the Polaris program but throughout U.S. industry and defense and that major improvements in calibration technology and methods were not only needed but attainable. Starting in 1955 we achieved revolutionary improvements in measurement and calibration technology (by a factor of 100 in many cases). Although initially opposed by large government and large business, the more accurate JRL technology finally replaced the earlier technology,(1)and its daily use throughout industry and government has helped give the U.S. leadership in modern, accurate electronic systems and devices.(2)

(1) JRL holds probably the record number of patents (48) in the highly specialized field of calibration.

(2) Unfortunately there is a systematic defect in society's procurements of "better mousetraps". As in Eli Whitney's development of the cotton gin, more imitations of JRL technology have been procured than originals.

Although the development of improved calibration and standards technology is fundamental to defense, industry and commerce, it is not attractive to large business because of the relatively small dollar volume of the market. Starting in 1955 the U.S. need for improved calibration technology was very successfully met by a handful of smaller companies dedicated to the highly specialized development and manufacture of the unusually high-performance equipment required. However, starting in the early 1970's two large companies (Hewlett-Packard and John Fluke Mfg. Co.(3)) began a gradual takeover of the government calibration equipment market, supplying large, expensive automated systems, generally on sole-source or otherwise restrictive procurements, to replace the smaller company calibration equipment in use.

The result of these restrictive procurement practices has been to put the original small company supplier of highly accurate calibration technology out of business, and to supplant the high-performance, calibration grade equipment originally used for government calibration with low-performance, commercial grade, large company equipment.

The underlying intent of government procurement regulations is simply set forth in Public Law 9683 as --- "Economy Efficiency, Effectiveness with Equity". However, in 40 years, I have not seen procurements as violative of this underlying intent as the ones in military calibration procurement today. My own recent experience with Army calibration procurements and evaluations, over the time span from 1974 to 1981, makes a series of horror stories adding up to one gigantic nightmare. As nightmares do, things start out pleasantly with a decision by the Army in 1973 that old-fashioned calibration by labor-intensive manual methods is too slow, expensive and lacking in quality to satisfy the Army's needs and that high-performance automated calibration equipment must be obtained to solve the problem.

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(3) During part of this period Dave Packard was active as Deputy Secy of Defense and John Fluke organized and chaired the Fluke Task Force on Electronic Test Equipment jointly sponsored by DOD and large industry.

Fortunately, in 1968 JRL had anticipated this need for improved calibration productivity/quality and had begun to develop automated versions of our best performance manual calibration technology in order to meet it. On March 1973, at about the same time that the Army stated its need, we publicly exhibited a major technological breakthrough -- full high-performance calibration capability at almost 10 times the speed (1/10th labor cost) of manual calibration.

Now the nightmare starts -- although the Army used its stated need for better, more cost effective calibration technology to justify many extensive and expensive procurements between 1974 and the date of this statement, every bid and every unsolicited offer JRL made during that entire 7 year period was summarily rejected. One timely bid was rejected without even being opened! Every one of the Army's calibration procurements for which we were qualified went in alternation to the two large commercial test equipment manufacturers-HP and Fluke, either by sole source procurement, fictitious competition or small business "steal-aside". Each and every one of the Army's procurements and evaluations violated the express intent of government procurement regulations by being flagrantly arbitrary, capricious, restrictive, grossly wasteful, inefficient, or ineffective.

Assuming that Army underling "errors" would not prevail against the truth, I tried to bring the facts to successive levels of Army officialdom, but discovered that the decentralized, absentee-management philosophy of the Army makes it absolutely immune to correction from within or without. Army overlings always bucked the facts back to the self-same underlings at Redstone Arsenal and DARCOM, where they were always, of course, rejected.

Finally after six years of politely and patiently searching for a remedy within the Army I sent a last desperate appeal to three Army senior officials on June 5, 1980(4). The letter stated the seriousness of the key issues involved

- unfair treatment of a high technology defense supplier
- a substantial waste of the citizen's taxes coupled with a weakening of his military defense

and made a respectful request for a meeting to show the documentation supporting the letter. A gifted reporter/cartoonist (R. Hafer) and I even conveyed the importance of these issues in a set of four cartoons(5). The letter and request for a meeting were rejected. With this final rejection we ended our six year experiment at reasoning with Army officials and pointed in the direction of Congress, the media and the public. Using the voluminous data and documentation we had assembled from 1974 to 1980, Mr. Hafer set forth the essential facts in a 44 page booklet.(6) The booklet's co-victims (muggees) are JRL (high technology, mobilization-base calibration equipment supplier), U.S. citizens (being robbed of several hundred millions of dollars and of a working defense capability) and the Army combat soldiers and support technicians

(4) 5 June 1980 Letter to John R. Guthrie

(5) "A VERY GRIM FAIRY TALE"

(6) Booklet "You're Not Supposed To Get Mugged By Your Own Army"

(also being deprived of effective equipment and field support)The Army perpetrator in the booklet (mugger) is not the fighting Army but the administrative or bureaucratic Army.

This booklet, which set the facts forth clearly, simply, accurately and powerfully, was successful in enlisting Congressional support and media attention(7). Through the good offices of Congressmen Addabo and Weiss, the GAO audit division was directed to conduct an investigation to confirm the facts in our booklet and a field trial of our equipment by the White Sands Missile Range of TECOM (the Army's own Test and Evaluation Command) was undertaken.

On 2 March 1981, 3 April 1981, 15 July 1981 and 27 July 1981 an official Congressional briefing(8), letter report(9) and savings analysis(10) by GAO and the official WSMR test report(11) essentially vindicated the correctness of the Julie position.

Logically the favorable Congressional, GAO and WSMR findings should have ended the nightmare, and permitted us at long last to end the mugging but, unfortunately, what we are looking at is just the opposite.(12)(13) In spite of the fact that the defense department procurement system has finally given us the fair and successful evaluation it should have given us 7 years ago and that

(7) 31 October 1980 Letter from Congressman Ichord. Also see Book 2,pp33-38

(8) See 20 March 1981 Letter to Secretary Weinberger

(9) See Book 2- "Where Were You During The Coup", pp 30-32

(10) See Exhibits B1-4

(11) See Exhibits A1-5

(12) See Reference (8)

(13) 7 October 1981 Letter to W. Matlock, 11 September 1981 Letter to General Moore

WSMR's report concluded that we are 2 to 3 times better and faster than HP, Fluke and manual calibration (14), nothing has improved.

(a) JRL , the offeror of this beneficial technology, is much poorer than it ought to be -- In August 1981, after 25 uniquely successful years spent developing improved calibration technology, and after having been systematically starved out of the Army's calibration procurements for 7 years, JRL informed the Army and the Congress that it had run out of time and would not be able to survive much longer. The Army, needing 52 precision AC calibrators (originally developed by small company Optimation, now part of Julie), responded by passing through a 100% small business set aside to large business Fluke in yet another small business steal aside!

(b) The fighting soldier's calibration and weapon system support continues to be much weaker and labor intensive than it should -- Army calibration failures are as high as 50% in some depots as a result of the fact that 5 scarce-as-hen's-teeth technicians, with obsolete manual equipment, are needed to do the job that one of them can do using Julie equipment!

(c) The U.S. defense budget and the taxpayer continue to be robbed-- the majority of cost estimates, using either industry or Army data, and a variety of calculations, show Julie cost of $15 vs. non-Julie $60 cost for full performance calibration (a 75% cost avoidance). Army data submitted to Congressmen Addabo shows applicability of this $45 saving to 31% of 833,000 calibrations, i.e.-$11,620,000 cost avoidance per year or approximately $1Million per month. The 7 procurement years lost thus far (84 months) have already wasted $84 million (75%), not including substantial additional losses on the misprocured, ineffective and discontinued HP and Fluke systems.

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(14) Excerpts July 1981 Report WSMR - "LOCOST 106 Automated Calibration System Evaluation", with JRL addendum

(d) The U.S. calibration mobilization base and surge capability are much weaker than they ought to be--Most of this lengthy procurement horror history took place before the present administration took office. Remedial action could have been taken early in 1981 not only in view of the Reagan/Bush committee letter (15), but as an earnest of the new administration's steadfast opposition to waste and inefficiency, its steadfast interest in strengthening defense and its steadfast appreciation of the need for protecting the U.S. industrial base. Continued adverse government action or inaction would not only be unfair to JRL but would permanently deprive the U.S. of the services of a leading defense supplier with unmatched capability in calibration technology.

(e) U.S. defense, industry and productivity are much poorer and weaker than they ought to be -- the regular infusion of new, improved technology is essential to U.S. defense and industrial leadership and, in this process, government procurements can play either a supportive or destructive role.

Historically, President Thomas Jefferson defended the small Eli Whitney company against an Army contract cancellation and not only won improved, mass-produced rifle technology for the Army but, through the consequent technological advances of the Eli Whitney company, won world leadership in industrial production for the U.S. Similarly, President Teddy Roosevelt interceded for the small Orville and Wilbur Wright company against Army procurement opposition, and not only won improved airplane technology for the Army but, through the consequent technological advances of the Wright Aircraft company won world leadership in commercial aviation for the U.S. (16)

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(15) 11 September 1980 - Letter from Reagan Bush Committee

(16) 26 January 1978 - Testimony to Congressional Committee on Science Technology by Dr. Obermayer

By contrast, the father of rocketry - Robert Goddard - was comparatively neglected by the U.S. government during his lifetime(17) and, as a result, leadership in rocketry went to the Nazis, using Goddard's ideas and patents. The defeat of Germany in the second World War led to a capture of the Nazi-appropriated Goddard technology, which was then divided between the U.S. and U.S.S.R.

In our time and relative to the subject of this hearing, U.S. defense and industry appear to need technology for a second industrial revolution-(i.e. technology offering a ten-fold labor-saving reduction in maintenance cost) comparable to technology for the first industrial revolution (i.e.- the Whitney technology offering a ten-fold reduction in manufacturing cost).

I believe that the high point of my 40 years of engineering and scientific effort has been the development of improved technology offering a ten-fold labor-saving reduction in test instrument maintenance cost (i.e.- calibration) and that this constitutes a major first step towards the necessary second industrial revolution.

Unfortunately, as a result of the adverse procurement actions of the Army, and absent tangible support from the Congress or the President, I am fearful that the U.S. will not only lose JRL as a mobilization base supplier, and lose the previously cited large quantity, quality and cost benefits for the Army but will lose potentially revolutionary benefit of the JRL technology for the rest of our defense and industrial society as well.

I thank the committee for permitting me to testify.

(17) 28 July 1978 - EE Times Editorial

U.S. INNOVATION IN MEASUREMENTS -- PAST, PRESENT, FUTURE

Loebe Julie
Julie Research Laboratories, Inc.
New York, New York, 10023

ABSTRACT

The author reviews 37 years of experience in design and innovation of technology for precision instrumentation, and the impact of such new measurement and design concepts on the overall instrumentation art. The effectiveness of new design concepts and new product developments is evaluated from a cost and figure-of-merit standpoint. Examples of the development of innovative technology and concepts are given and two new instrument designs for automated measurement are described. The paper concludes with a discussion of the problems presently confronting the U.S. developers of new technology and the fact that we are now in a climate that is generally hostile to scientific innovation in this area. A brief outline of the paper is given below.

HISTORY

The history of U.S. developments and leadership in science and technology goes back 200 years to the early days of our country. Eli Whitney, who was the first of a distinguished line of American designers and inventors, had the support of high level government officials, including Thomas Jefferson, and the contractual support of the U.S. Army. Following Whitney, American inventors and American industry had an outstanding record of leadership in new technological areas. Unfortunately, as discussed in the final section on NEW TECHNOLOGY PROBLEMS, U.S. innovation is being forced into a state of decline and most organizational actions are presently inimical to the continuation of American leadership in science and technology.

Fig. 1 Operational Amplifier Design (1943)

The author can speak from personal experience about his 37 years devoted to the development of new instrumentation and measurement technology. In 1943, to meet World War II defense needs, he developed the design of the modern operational amplifier and new techniques for analog computation that began modern analog circuit and computer technology. Subsequently, to meet the needs of the U.S. Polaris, Poseidon, Apollo and Trident programs, his efforts were devoted to designing higher accuracy components, instruments and precision test, measurement and calibration systems. The development in 1955 of new types of precision resistors of very high accuracy, and later of new types of ultra-accurate instruments and systems made the modern precision analog and high accuracy gyro navigational system possible. The impact of this work has been fairly large, with operational amplifiers, DC analog computation and ever-higher-accuracy instrumentation and measurement becoming essential to all modern scientific and technological activity.

NEW TECHNOLOGY DRIVING FORCES AND FIGURES-OF-MERIT

Throughout most of the author's experience he has responded to extremely powerful driving forces for developing urgently needed user-oriented new technology:

(1) Win World War II by designing new analog computation technology to control new Azon, Rason, Roc guided missiles.
(2) Get Polaris, Poseidon, Apollo and Trident flying by breaking performance and calibration accuracy bottlenecks on resistors, test instruments, zeners, gyros, analog computers and inertial navigation systems.

However, most design and development now taking place responds to other driving forces, which are different for the inventor, marketing manager or businessman and for the buyer or seller.

The author, who is primarily active as better mousetrap maker (inventor and builder), rather than as mousetrap seller (marketeer and businessman) would rate the following figure-of-merit factors highest in evaluating new design concepts and technology: increased accuracy, increased speed, increased sensitivity, increased range, increased convenience, increased simplicity, increased calibratability, increased repairability, increased learnability, increased effective life, increased ownership economy. Certainly everyone concerned with measurement instrumentation would agree with the importance of these strongly user-oriented figure-of-merit factors. Very often, however, emphasis in new design is given to seller-oriented factors such as early (planned) obsolescence, cosmetic changes, gimmickry and fashion pull (conspicuous consumption), largest marketability and highest profitability. There is an inherent and destructive conflict between the two sets of design evaluation factors listed above.

PRESENT DEVELOPMENT TRENDS

As of 1970, the driving force for higher accuracy had brought JRL component, instrument and standards designs to accuracy levels as high as 3 parts in one hundred million. At the same time increases in the range and sensitivity of accurate measurement were very great, extending down to nano levels of test values and up to giga or tera levels. Now one decade later, these accuracy, sensitivity and range achievements are still more than sufficient for our present-day requirements. What we have chosen as our design problem for new instrumentation for this decade has been the substantial reduction in the cost of ownership and cost of use of high performance instruments — primar ly reduction in the labor cost of learning an instrume using it, calibrating it and repairing it.

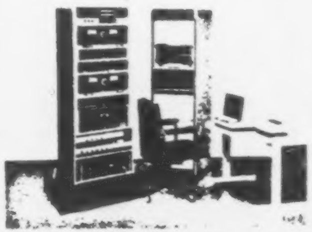

Fig. 2 Automated High Precision Measurement System (1973)

While all designers seem to be attacking the same problem, the population of instruments of hyper-complex design is increasing rapidly. This raises questio about the learnability, simplicity and repairability o the new ultra-complex instruments. There are real concerns in industry about the ability of today's (or tomorrow's) users to operate and to repair instruments each containing sophisticated computer hardware an software (in microprocessor form), and each requirin computer expertise for understanding the function an the repair of the instrument. Only time will tell whether the new, admittedly complex, and alleged smart designs will prove to be smarter or less smart th their predecessors.

Current designs being carried out in JRL laborato ries include a new automated instrument for oscilloscope calibration and a new instrument for automati distortion analysis. At the present time, the calibration and repair of oscilloscopes, plug-ins, and the calibration and repair of signal and function generators is extremely time consuming. Although the tota market for automated equipment to perform these ca libration and repair functions is quite small, the auth believes that the development of new, high figure-merit instruments for these applications to be worthwhile. The two new instrument designs are describe in the paper.

NEW TECHNOLOGY PROBLEMS

The experience cited above was part of an outstanding American success in technological innovati during the years from World War II to the beginning the 1970's. However, the present U.S. climate for i novation in instrument design and technology is not vorable, and neither the commercial nor the government marketplace are as receptive to innovations in instrument technology as in previous decades. While there is increasing recognition of this problem, and spite of the availability of plans and programs to ov come it, nothing effective or affirmative is being d to stop the resultant slippage in our new design cap bility.

Unfortunately, the end result of our inaction wi be the unnecessary and disastrous loss of U.S. leade ship in new instrument technology. Although the au thor has spent several years alerting our professional societies and government agencies to this problem, in spite of ever-increasing documentation supportin his grim forecasts, neither the professional societies the government agencies seem to be listening.

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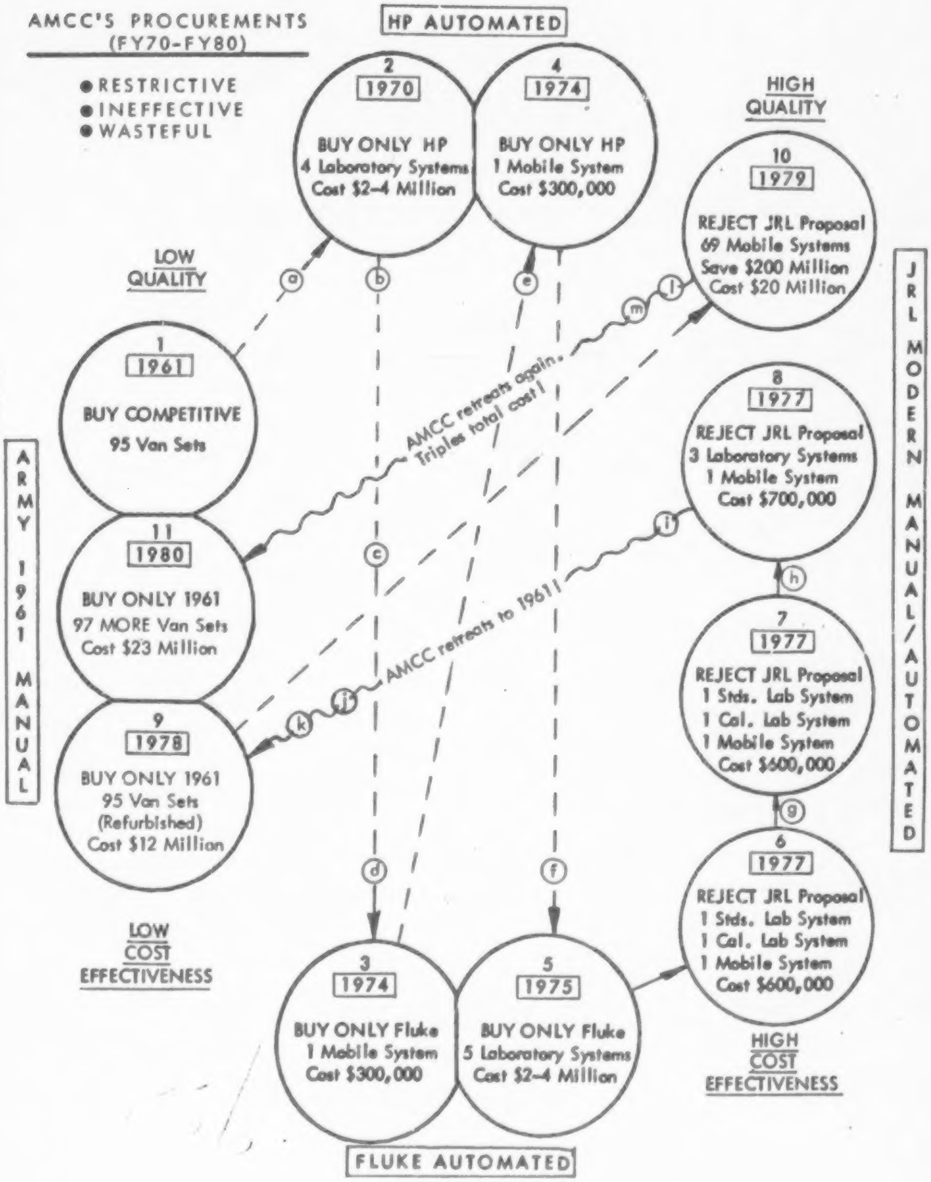
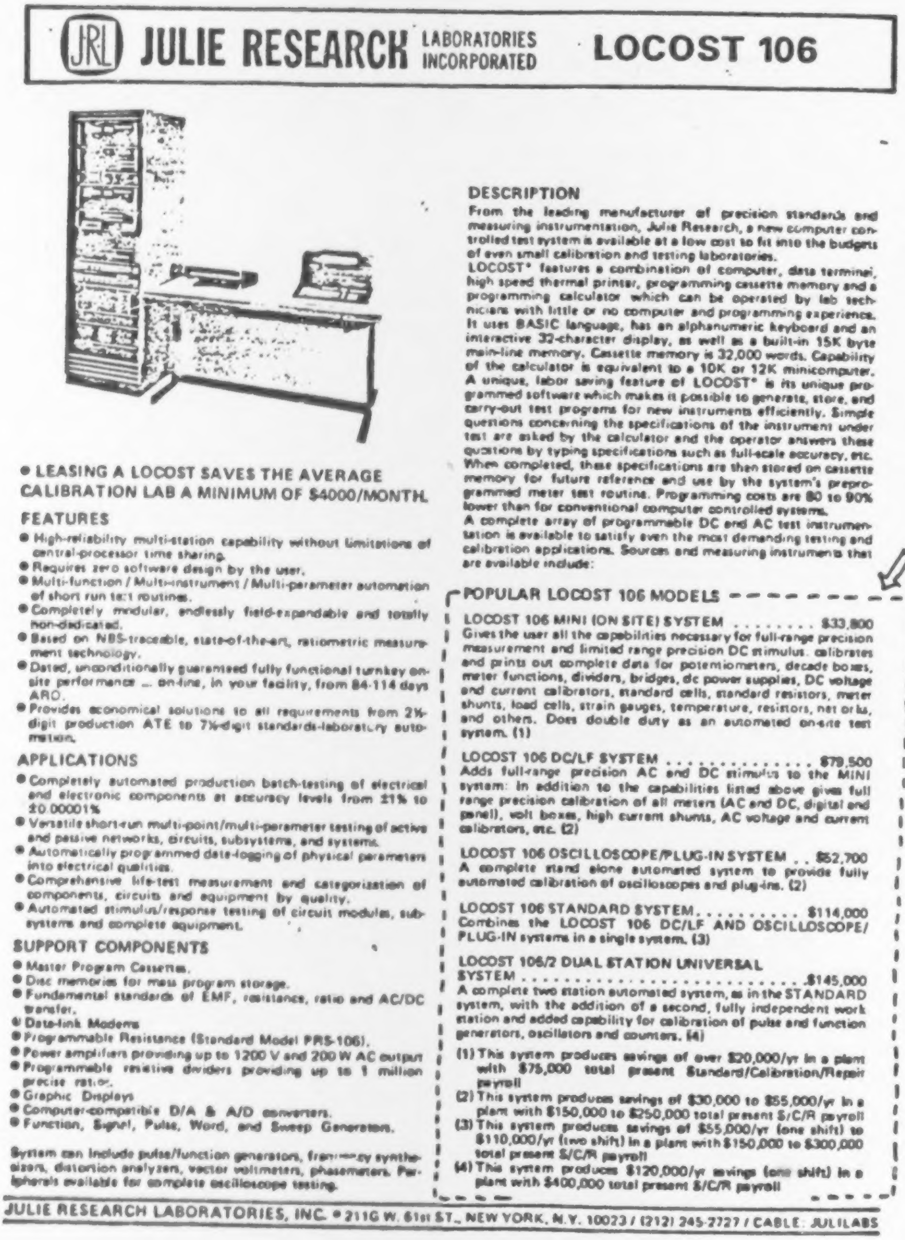
LOCOST 106
LOCOST 106


AMCC'S PROCUREMENTS
(FY70–FY80)
● RESTRICTIVE
● INEFFECTIVE
● WASTEFUL
HP AUTOMATED
2
1970
BUY ONLY HP
4 Laboratory Systems
Cost $2–4 Million
4
1974
BUY ONLY HP
1 Mobile System
Cost $300,000
HIGH
QUALITY
10
1979
REJECT JRL Proposal
69 Mobile Systems
Save $200 Million
Cost $20 Million
LOW
QUALITY
JRL MODERN MANUAL/AUTOMATED
1
1961
BUY COMPETITIVE
95 Van Sets
ARMY 1961 MANUAL
AMCC retreats again.
Triples total cost!
8
1977
REJECT JRL Proposal
3 Laboratory Systems
1 Mobile System
Cost $700,000
11
1980
BUY ONLY 1961
97 MORE Van Sets
Cost $23 Million
AMCC retreats to 1961!
7
1977
REJECT JRL Proposal
1 Stds. Lab System
1 Cal. Lab System
1 Mobile System
Cost $600,000
9
1978
BUY ONLY 1961
95 Van Sets
(Refurbished)
Cost $12 Million
6
1977
REJECT JRL Proposal
1 Stds. Lab System
1 Cal. Lab System
1 Mobile System
Cost $600,000
LOW
COST
EFFECTIVENESS
3
1974
BUY ONLY Fluke
1 Mobile System
Cost $300,000
5
1975
BUY ONLY Fluke
5 Laboratory Systems
Cost $2–4 Million
HIGH
COST
EFFECTIVENESS
FLUKE AUTOMATED
a
b
c
d
e
f
g
h
i
j
k
l
m

Comparison of DOD CALIBRATION PROGRAMS

	ARMY	AIR FORCE	NAVY
DATA COLLECTION	BY SERIAL NO.	BY SERIAL NO.	BY SERIAL NO.
SIZE CALBR/YR	1.2 M	1 M	1 M
FAILED EQUIPMENT	EXCLUDED	EXCLUDED	EXCLUDED
ANALYSIS	BY MODEL NO.	BY MODEL NO.	BY MODEL NO.
CRITERIA EOP ASSURANCE(%)	75%	85%	75%
AOP ASSURANCE(%)	90%	95%	85%
INTERVAL (DAYS)	120 MIN + MULT 120	90 MIN + MULT 30	30MIN + MULT 30

FIGURE 1



JRL JULIE RESEARCH LABORATORIES INCORPORATED **LOCOST 106**

● LEASING A LOCOST SAVES THE AVERAGE CALIBRATION LAB A MINIMUM OF $4000/MONTH.

FEATURES

- High-reliability multi-station capability without limitations of central-processor time sharing.
- Requires zero software design by the user.
- Multi-function / Multi-instrument / Multi-parameter automation of short run test routines.
- Completely modular, endlessly field-expandable and totally non-dedicated.
- Based on NBS-traceable, state-of-the-art, ratiometric measurement technology.
- Dated, unconditionally guaranteed fully functional turnkey on-site performance ... on-line, in your facility, from 84-114 days ARO.
- Provides economical solutions to all requirements from 2½-digit production ATE to 7½-digit standards-laboratory automation.

APPLICATIONS

- Completely automated production batch-testing of electrical and electronic components at accuracy levels from ±1% to ±0.00001%
- Versatile short-run multi-point/multi-parameter testing of active and passive networks, circuits, subsystems, and systems.
- Automatically programmed data-logging of physical parameters into electrical qualities.
- Comprehensive life-test measurement and categorization of components, circuits and equipment by quality.
- Automated stimulus/response testing of circuit modules, subsystems and complete equipment.

SUPPORT COMPONENTS

- Master Program Cassettes.
- Disc memories for mass program storage.
- Fundamental standards of EMF, resistance, ratio and AC/DC transfer.
- Data-link Modems
- Programmable Resistance (Standard Model PRS-106).
- Power amplifiers providing up to 1200 V and 200 W AC output
- Programmable resistive dividers providing up to 1 million precise ratios.
- Graphic Displays
- Computer-compatible D/A & A/D converters.
- Function, Signal, Pulse, Word, and Sweep Generators.

System can include pulse/function generators, frequency synthesizers, distortion analyzers, vector voltmeters, phasemeters. Peripherals available for complete oscilloscope testing.

DESCRIPTION

From the leading manufacturer of precision standards and measuring instrumentation, Julie Research, a new computer controlled test system is available at a low cost to fit into the budgets of even small calibration and testing laboratories.

LOCOST* features a combination of computer, data terminal, high speed thermal printer, programming cassette memory and a programming calculator which can be operated by lab technicians with little or no computer and programming experience. It uses BASIC language, has an alphanumeric keyboard and an interactive 32-character display, as well as a built-in 15K byte main-line memory. Cassette memory is 32,000 words. Capability of the calculator is equivalent to a 10K or 12K minicomputer.

A unique, labor saving feature of LOCOST* is its unique programmed software which makes it possible to generate, store, and carry-out test programs for new instruments efficiently. Simple questions concerning the specifications of the instrument under test are asked by the calculator and the operator answers these questions by typing specifications such as full-scale accuracy, etc. When completed, these specifications are then stored on cassette memory for future reference and use by the system's preprogrammed meter test routine. Programming costs are 80 to 90% lower than for conventional computer controlled systems.

A complete array of programmable DC and AC test instrumentation is available to satisfy even the most demanding testing and calibration applications. Sources and measuring instruments that are available include:

POPULAR LOCOST 106 MODELS

LOCOST 106 MINI (ON SITE) SYSTEM $33,800
Gives the user all the capabilities necessary for full-range precision measurement and limited range precision DC stimulus. calibrates and prints out complete data for potentiometers, decade boxes, meter functions, dividers, bridges, dc power supplies, DC voltage and current calibrators, standard cells, standard resistors, meter shunts, load cells, strain gauges, temperature, resistors, net orks, and others. Does double duty as an automated on-site test system. (1)

LOCOST 106 DC/LF SYSTEM $79,500
Adds full-range precision AC and DC stimulus to the MINI system: In addition to the capabilities listed above gives full range precision calibration of all meters (AC and DC, digital and panel), volt boxes, high current shunts, AC voltage and current calibrators, etc. (2)

LOCOST 106 OSCILLOSCOPE/PLUG-IN SYSTEM . . $52,700
A complete stand alone automated system to provide fully automated calibration of oscilloscopes and plug-ins. (2)

LOCOST 106 STANDARD SYSTEM. $114,000
Combines the LOCOST 106 DC/LF AND OSCILLOSCOPE/PLUG-IN systems in a single system. (3)

LOCOST 106/2 DUAL STATION UNIVERSAL SYSTEM $145,000
A complete two station automated system, as in the STANDARD system, with the addition of a second, fully independent work station and added capability for calibration of pulse and function generators, oscillators and counters. (4)

(1) This system produces savings of over $20,000/yr in a plant with $75,000 total present Standard/Calibration/Repair payroll
(2) This system produces savings of $30,000 to $55,000/yr in a plant with $150,000 to $250,000 total present S/C/R payroll
(3) This system produces savings of $55,000/yr (one shift) to $110,000/yr (two shift) in a plant with $150,000 to $300,000 total present S/C/R payroll
(4) This system produces $120,000/yr savings (one shift) in a plant with $400,000 total present S/C/R payroll

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FIGURE 2

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1976 Hardware Comparison for Calibration of METERS

HARDWARE NOMENCLATURE	MODEL		
	LOCOST 106	JF. T/10	HP 9651
PROCESSOR	HP 9830B (ROM I/O + 8K Memory)	Digital Equipment Corporation (32K Random Access Read/Write Memory)	HP 2100
KEYBOARD	Part of HP 9830B Calculator	JF 1300C Keyboard & CRT Display	HP 2645A
I/O INTERFACE	JRL MMP 106	JF 1100A	HP 2151A
PRINTER	HP 9866	DEC LA36	HP 9866
MASS STORAGE	*Single Cassette	Dual Disc	Dual Disc
SCANNER	JRL SM2100	JF 1200	HP 9500-60001
TRANSITION MODULE	JRL MUX-LF 106	JF 7505B	P/O Scanner
DC VOLTAGE STANDARD	JRL AVS-106	JF 3330B	JF 3330B
DC CURRENT STANDARD	JRL ACS-106	JF 3330B and JF 4250	JF 3330B & HP 6321
RESISTANCE STANDARD	JRL PRS-106	JF 1740A	P/O Scanner
RATIO STANDARD	JRL RVD-106	JF 1740A	P/O Scanner
AC VOLTAGE/CURRENT STANDARD	JRL AC 128L with JRL PA225 HV Adapter and JRL CS 129L AC Current	JF 5200/5205 & Sorenson SRL-40/12	HP 745/746 & No High Level AC Current
DVM	JRL DM 1060 + JRL BA108 Buffer + AC/DC Converter	JF 8400A AC/DC Voltage/Current Resistance	HP 3480 HP 3450
AC LINE SOURCE (VARIAC)	GR 1592	GR 1592	GR 1592

SOURCE: 15 MARCH 1977 DARCOM EVALUATION OF AN UNSOLICITED PROPOSAL ON "A MULTIPHASE PROGRAM FOR OPTIMIZING TMDE MAINTENANCE/CALIBRATION" — SUBMITTED BY JULIE RESEARCH LABORATORIES ON 21 MAY 1976

FIGURE 3 a.

1976 Hardware Comparison for Calibration of OSCILLOSCOPES & SIGNAL GENERATORS

HARDWARE NOMENCLATURE	MODEL		
	LOCOST 106	JF T/10	HP 9551
PROCESSOR	HP 9830B	Multistation	HP 2100
KEYBOARD	Part of HP 9830 Calculator	JF 1300C Keyboard & CRT Display	HP 2645A
I/O INTERFACE	JRL MMP 106	JF 1100A	HP 2151A
PRINTER	HP 9866	DEC LA36	HP 9866
MASS STORAGE	JRL Cassette Single	System Industries Dual Disc	HP 7900 Dual Disc
SWEEP GENERATOR	WAVETEK 2001	WAVETEK 2000	HP 8660 HP 3320
RF MILLIVOLTMETER	BOONTON 92AD	BOONTON 92BD	RF Wattmeter HP 432
DISTORTION ANALYZER	HP 334A + Opt H25	HP 334A + Opt H25	HP 334A + Opt H25
COUNTER	HP 5326B	HP 5327A	HP 5326B
AMPLIFIER	JRL 154M	ANZAX Amp.	N.A.
FUNCTION GENERATOR	WAVETEK 154J	JF 4250 JF 6160 Freq. Syn.	HP 8860 & HP 3320
FAST RISE GENERATOR	—	TEK 106	HP 8004
TRANSITION MODULE	JRL MUX-OS	JF 7510A	P/O Scanner
AC LINE SOURCE	GR 1592	GR 1592	GR 1592
SCANNER	JRL SM2100	JF 1200	HP 9500-60001
DVM	—	JF 8200	HP 3480 HP 3450

SOURCE: 15 MARCH 1977 DARCOM EVALUATION OF AN UNSOLICITED PROPOSAL ON "A MULTIPHASE PROGRAM FOR OPTIMIZING TMDE MAINTENANCE/CALIBRATION" — SUBMITTED BY JULIE RESEARCH LABORATORIES ON 21 MAY 1976

FIGURE 3 b.

JULIE RESEARCH LABORATORIES

		LACS 1974	Unsolicited Proposals 1976	1979
JRL AVS-106	DC Voltage Source	x	x	x
JRL PVD-126	Voltage Divider	x	x	x
JRL ACS-106	DC Current Source	x	x	x
JRL PRG-106	Resistance Source	x	x	x
JRL AC-129	AC Voltage Source	x	ACL 128	x
JRL PA-225	AC Voltage Amplifier	x	x	x
JRL CS-129	AC Current Source	x	x	x
JRL MNP-106	Multi Programmer	x	x	x
JRL MUX-LF	Interface UUT/106	x	x	x
JRL MUX-RF	Interface UUT/106	x	x	x
JRL MUX-OS	Interface UUT/106	x	x	x
JRL 154 M	Amplifier	x	x	x
JRL DM-1060	Digital Multimeter		x	x
JRL SM-2100	Multi Scanner		x	x
JRL LMT-1110	AC Converter		x	x
JRL BA-108	Low Voltage Amplifier		x	x
HP 334A	Distortion Analyzer	x	x	x
HP 5326A	Counter/Voltmeter	x	x	x
HP 9830	Controller/Calculator	x	x	HP 9835A
HP 9880	Mass Storage/Disc Drive	x		
HP 2748	Paper Tape Reader/Printer	x		
HP 9866	Thermal Printer		x	
Wavetek 2001	Sweep Generator	x	x	x
Wavetek 1002	Sweep Generator	x		
Wavetek 154J	Function Generator	x	x	x
Boonton 92AD	RF Voltmeter	x	x	x
GR 1592	Variable Power Source	x	x	x
TEK 4006	CRT Display		x	

FIGURE 4

REPONSES TO WRITTEN QUESTIONS SUBMITTED BY SENATOR JACKSON

Question. In 1968 you were awarded a contract from the Army Missile Command for 122 AC/DC differential voltage measuring systems. I understand that the contract was terminated by the Army in March 1969 because your equipment did not meet specifications in several major and a number of minor ways. You appealed the termination and after three years of negotiations you reached a settlement with the Army in which you agreed to reduce the contract price from $230,000 to $9,000 which constituted payment in full and complete settlement by reason of termination for the convenience of the government in lieu of termination for default.

Redstone's chief engineer at the time, Mr. Melvin Fruechtenicht, said in the November 1980 issue of Industrial Marketing that the government settled out of court because it would be cheaper, and agreed to pay your legal fees to keep your small business from going bankrupt. Mr. Fruechtenicht is quoted as saying, "That (the settlement) leaves Julie with a clean slate, free to harass the government again . . ."

Would you explain to the committee the reason for the failure of your product to meet the specifications of the contract with the Army in this case.

Answer. Our booklet "You're Not Supposed To Get Mugged By Your Own Army" only included the Army's calibration command procurement "dirty tricks" from December 1974 on. There were many earlier ones, including the 1968 incident you mention, and they all centered around Mr. Fruechtenicht, the individual you quoted. Let me clarify the part Mr. Fruechtenicht played in this entire history.

(a) In the early 1960's the Army calibration command, headed by Mr. Fruechtenicht, did not reside at Redstone Arsenal but at Frankford Arsenal.

(b) Because of procurement or performance problems, or both, that command had to undergo an investigation by an Army team from the White Sands Missile Range, headed by D. Hertzmark. The result of the investigation was a recommendation that the calibration command at Frankford Arsenal be closed down.

(c) The Army calibration command was next offered to WSMR and, when WSMR did not accept it, was moved to Redstone Arsenal.

(d) Unfortunately Civil Service regulations permitted the Frankford Arsenal group, under Mr. Fruechtenicht, to regain control of the calibration command by moving to Redstone Arsenal. The calibration problems of the Fruechtenicht group at Redstone Arsenal, now confirmed by GAO and Army Inspector General's investigations, are far more serious than those which closed down the calibration command at Frankford Arsenal.

(e) In 1968 Mr. Fruechtenicht and his group set out to procure a quantity of Fluke differential meters via a pseudo-competitive procurement (i.e. supply Fluke Model 887 or equal). When Julie successfully low bid, the Fruechtenicht team frantically introduced an unattainable change in the detailed specifications (to 90 percent relative humidity), insisting that Fluke's 887 complied. Even after Julie procured and tested the Fluke 887 at 90 percent R.H. and proved that it failed, Redstone insisted that the 90 percent RH specification must be met. Julie then invented a radically new design capable of performing at 90 percent RH, which passed full acceptance tests (including humidity) under the watchful eye of the government inspector (DCASR) in charge of acceptance. Fruechtenicht's staff then terminated Julie for alleged default after performing prolonged and exhaustive humidity tests (unwitnessed by Julie), and returned the Julie bid sample mysteriously damaged by chemical contamination from their humidity test procedure.

(f) Mr. Fruechtenicht then reawarded the procurement to Fluke, and tried to collect approximately $50,000 from Julie as differential costs. Before the Contract Board of Appeals, cross-examination of Mr. Fruechtenicht's staff under oath elicited testimony that incorrect and conflicting information had been submitted by his staff and that a strange sequence of events prior to award suggest that there may have been pricing leaks from procurement to technical personnel and collusion between Army personnel and Fluke on the 90 percent RH specification change.

(g) The Fruechtenicht staff was forced to admit under oath that their pre-award engineering allegation that the Fluke 887 did meet the 90 percent RH revised specification was based solely on their reading a revised data sheet provided them by the Fluke company. Next, questioned about the government inspector's (DCASR) acceptance data on the Fluke 887 performance at 90 percent RH, following termination of Julie's contract, the Fruechtenicht staff admitted that the DCASR inspector had never witnessed it because he went on a plant tour at the time of that particular test. Finally, questioned about the Fruechtenicht staff's own acceptance test data on the Fluke unit at 90 percent RH they admitted that the Fluke unit wasn't humidity tested at all!

(h) I quarrel with Mr. Fruechtenicht's self-serving allegations to Industrial Marketing because, even after the damaging admissions by his staff in court, Mr. Fruechtenicht still insisted that Julie be held at fault and pay the Army $50,000. However, within 30 minutes after learning that he would be called on to testify under oath, Mr. Fruechtenicht decided to accept the judge's recommendaton shifting fault to the Army and awarding Julie a no-fault termination (for convenience) together with payment of Julie's legal costs of $9,000.

(i) There is nothing in this factual record to lend credibility to Mr. Fruechtenicht's sanctimonious comments to Industrial Marketing. In fact, it is extremely enlightening to read that Julie was guilty of "harassing" the Army in 1968. If the Army's perception is that Julie was the agressor in 1968 and the Army the victim, it would explain the Army's current allegations (which are completely unsupported by any evidence), that the extenuating circumstance behind its admittedly abusive procurements was Julie's aggressive demeanor.

Question 2. Standard and Poors indicates that JRL had annual sales of approximately $1 million during the years 1976 through 1980. During the same period other major suppliers of similar equipment in the electronics field experienced growth rates of 25 to 30 percent on an annual basis. If your company makes a superior product why have your sales in the cost-effective commercial marketplace remained flat during a period of explosive growth in the industry?

Answer. As I stated in my testimony, the systemic defect in society's procurement of "better mousetraps" has always frustrated American innovators—almost two centuries ago more copies of Eli Whitney's cotton gin were sold than originals. In a marketing dominated society, the key to explosive growth is not innovation (aggressively developing new technology) but marketing (aggresively selling existing technology).

It would be highly beneficial if this were not so. If society did, in fact, beat a path to the door of the better mousetrap maker instead of lazily buying the status quo mousetrap, society could reap the benefit of every kind of performance improvement imaginable by man. Industry and society could then be in a Renaissance mode instead of a systemic decline.

I have twice attempted to suggest practical means to accomplish this desirable change. I went first to the Comsumer's Union and then to the National Bureau of Standards to recommend an extension of their existing objective performance testing services to include the testing of competitive commercial products, now widely purchased by industry and government, and generally procured nonobjectively (on the basis of marketing hoopla, good old boy salesmanship or whatever). Properly organized and run, an impartial and objective U.S. testing laboratory would not only save major amounts of money for industry and government (best-buy products are significantly cheaper and better than worst-buy products), but would loosen the stranglehold that advertising, media, good old boy networks and other marketing devices presently have on the sale of goods. Better mousetrap makers would then no longer be invisible in the market place and "explosive growth" could go to the most performance innovative rather than to the most marketing innovative producers.

(a) To the extent that the U.S. changed the sale of goods from a marketing/advertising dominated process (the well-known 5 cents worth of soap in a 95 cent box) to a performance/merit dominated process (which can give 95 cents of soap in a 5 cent box), our society could advance from its present industrial decline. Achieving this worthwhile objective is another project being undertaken by our new Committee Against Waste and Abuse in Government Procurement.

(b) In my company's specific case, although I have not grown rich, my innovations form the base for much of our country's technological (and my competitor's material) wealth. There would be billions of dollars missing of large company industrial and military products, if not for the operational amplifier, analog computer, precision resistor, precision standards, precision zeners, precision gyros, precision instruments and precision inertial guidance systems I first introduced or helped launch. Unfortunately for JRL these have been copied—but that fault is not ours.

(c) Lastly, consider the fate of my 1973 "better mousetrap" the LOCOST 106 automated calibration system. Is it our fault that it has taken 7 years for the truth to surface, correcting grossly incorrect marketing information widely disseminated not only throughout the Army but throughout the rest of the government and industry? The truth—that the Julie "mousetrap" is 2 to 3 times faster, better and cheaper, as evaluated by an objective Army test laboratory, is certainly news that should have been widely disseminated 7 years ago. And if, as appears likely, U.S. Government and industry could 7 years ago have started to improve quality, and started to reduce calibration labor problems and costs, on a scale twenty times larger than the Army's (i.e.—$240 million total savings per year for a one-time capital investment of only $240 million)—then Julie's "explosive growth" could have started 7 years ago. Instead, marketing tricks prevailed and our large competitors sold their 2 to 3 times slower, worse and more expensive "mousetraps", and increased their size and profits 25 percent per year, while we languished.

Question 3. Your comic book No. 2 estimates savings of $200 million to $600 million could have been achieved if the Army bought your product as opposed to what was purchased. It is my understanding that the Army's annual operating budget for calibration and repair is approximately $40 million plus military pay and allowances of about $14 million. Would you explain the method by which you arrived at this projected level of savings and could you explain how it is possible to achieve a 50-percent overall savings over a 10-year period when your equipment addresses only a small portion of the Army's total calibration requirements. Are you aware that neither the GAO nor the Army's Inspector General were able to verify any specific amount of savings, if any, from use of your system although both indicated that there were deficiencies in the completeness of the Army's evaluation of your system in the procurement process.

Answer. One has to beware the Army's habit of passing on incorrect information about Julie capability (as noted in both the GAO and the Army Inspector General findings).

(a) On the other hand the Army has claimed 26 percent "addressability" for the John Fluke 5100 meter-calibrator (a very cheap and extremely low-grade device with much lower "addressability" than the Julie system). Elsewhere they have claimed a high-42-percent "addressability" for a system such as the Julie (1977 report) and a low-31-percent "addressability" for Julie (1980 report). An oral estimate of "addressability" from H. Gonzalez of the Army's Test and Evaluation Command at WSMR is 34 percent. Although the 31 percent figure was used in the GAO estimate, we think 34 percent is more plausible.

(b) The GAO reported savings of $16.2 million/yr, at a productivity of 3500 cal/year based on baseline parameters which they arbitrated between Julie figures and AMCC figures. These are set forth in Encl. 1 of their letter of July 15, 1981. The GAO also states that the method of computation they followed is mine and not theirs. However, neither the GAO investigators, nor the I.G. investigators who checked these savings estimates, have stated that there is an error in the method nor have they proposed a better method or a more accurate savings estimate. If you extend the GAO result to 20 years, in 1981 dollars, the savings projection totals $324 million. At 8 percent/year inflation for 20 years this extrapolates to more than $600 million savings in projected future dollars.

(c) The $16.2 million per year savings figure out of a total budget of $54 million is only 30 percent and not 50 percent. Also the Army systematically understates the actual total cost to the taxpayer of its overall calibration/repair support function. If $54 million is showing, allow 20 percent additional for miscellaneous hidden expenses borne by the taxpayer.

(d) The Army also systematically understates its support needs—allow 50 percent to 100 percent additional for the workload that the Army should be but is not doing. The $600 million savings estimate was based on a low figure of 560,000 total calibrations/year, used in the GAO letter. At the much higher real workload requirement, it is even more advantageous to replace the Army's current low-productivity manual or automated methods by the 2 to 3 times faster Julie equipment (as reported in the Army's audited WSMR report). Allowing for this higher workload (Fig. 1 of the Under Secretary of the Army's statement shows 1.2 million/yr instead of the 560,000/yr assumed by GAO) would actually make the $600 million estimate extremely conservative.

Chairman **Roth**. At this time, I would like to call the Under Secretary, Mr. Ambrose, and the Deputy Inspector General, Gen. Robert Solomon.

Gentlemen, will you raise your right hand. Do you solemnly swear to tell the truth, the whole truth and nothing but the truth, so help you God?

Mr. **Ambrose**. I do.

Chairman **Roth**. Thank you, gentlemen, please be seated.

Mr. Ambrose, we will call upon you first. As I said earlier, you may summarize, if you choose, your statement and it will be incorporated in the record as if read in its entirety. Please proceed.

TESTIMONY OF JAMES R. AMBROSE, UNDER SECRETARY, DEPARTMENT OF THE ARMY, ACCOMPANIED BY GEN. ROBERT SOLOMON, INSPECTOR GENERAL

Mr. AMBROSE. Thank you, Mr. Chairman, Senator Rudman. We do appreciate the opportunity to appear before this committee and address the questions that have been raised. One thing I would like to do before starting into the actual substance of these particular matters is to place in the record a statement with respect to the amount of small business dollar contracts that the Army lets. The amount for the past year is $3.99 billion.

So I think that it is not a fair premise to start from that the Army does not intend to or actually conduct small business business. That is approximately 25 percent, I believe, of the total business done in the Department of the Army, and this I don't happen to have with me, the total number of contracts is, of course, in many, many thousands of contracts across the country.

I didn't want to proceed into this without at least making that much of an indication that we are not in any sense opposed to small business.

I can associate myself, and I wish to, with the opening remarks of yourself, Mr. Chairman, and to other Senators. I appreciate in particular comments with respect to the new management of the Army because I am part of it. I am the newest part of it, I guess. We have every intention of asserting the respect that is implicit in your remarks.

I should, however, say that in saying that, I am not prepared to agree entirely that the JRL equipment is uniquely suitable for the kinds of purposes that we may have in this field. That is not to say that it won't work, simply that it is not, in our opinion, in my personal opinion, as a matter of fact, as unique as has been represented.

Nor am I prepared at this time to agree that in a fixed type defense budget, investment has its highest payoff in every respect as has been suggested by Mr. Julie. But I will address that and the consequences of my comments as I go through this statement.

You have my complete statement and a biography of me. And I will just go through it as quickly as I can and excerpt those things I think are most pertinent to this inquiry.

I have been officially in office since October 13, but I have been serving Secretary Marsh as a consultant for a little over 3 months.

It may be pertinent to this inquiry to take note of the fact that in my former industrial positions, I have both been a developer and a user of test equipment and have had oversight responsibilities for test equipment calibration and maintenance organizations and capital investments and, therefore, I feel that I am familiar in a general way with the subject matter of this hearing. That, of course, does not make me an expert in particular of the equipment Mr. Julie is talking about.

Late in August, the Secretary asked me to oversee this investigation by the Inspector General, I think in part because I have that background. He commissioned this investigation about 2 months after he had come into office because of the appearance to him, because the matter had simply not been brought to a proper conclusion in the years past and it deserved and he intended that it get a full and complete investigation.

The instructions to the Inspector General, which I fully supported, were to leave no stone unturned, to get to the bottom of this thing, let the chips fall wherever they would. I think the Inspector General has, in fact, done that.

This investigation started April of 1981. There were many charges. There were allegations and there were many witnesses. Testimony was taken under oath. There were many visits to many facilities. We are sorry that it has taken us so long. We are as impatient as anybody else to get to the bottom of this thing. The reasons, apart from the multitude of documents and people to be inquired into that has taken some time is very simple. JRL has made allegations those that are normal to a disappointed bidder and they brought into question as you heard the entire Army metrology system and its performance with respect to calibration quality.

And other allegations have been made which assert dollar savings which are not being gained and sundry imperfections in the Army procurement process. In other words, JRL investigations have gone to the heart of the Army's calibration procurement methodology and the concepts of operation. And we take that as a very serious matter, and we intend to get to the bottom of all of that.

That is why we took the very unusual step of commissioning the Inspector General and his staff to go through this in great detail. We felt to have any other group within the Army under the circumstances that they had been named one way or the other as being involved in these matters would simply not lead to a correct and suitable result.

This investigation had been intended to end about the middle of September. But early in September, as I think all of you know, there was a further development in a particular procurement that involved Julie and the charges that arose in that, we felt, had to be incorporated in this investigation and they had to take, unfortunately, some further time to get to the bottom of that.

The report of the Inspector General has been finished in its substance. It is to be released November 16. We have done our best to accommodate your timing of these hearings by having the Inspector General provide me with a draft copy of this report. Last Saturday morning, as a matter of fact, it was delivered to me on the west coast.

I spent the entire weekend going through it and writing the statement which you have in front of you. I assure you that we have done everything in our power—I speak for myself, Secretary Marsh and the Inspector General—in being comprehensive and objective and thorough as we know how in getting through this thing.

Now, there were a large number of issues raised. These will all be reported in great detail by the complete report. They have been summarized in the Inspector General's brief which has been provided to you and which should be made, if it hasn't already, a part of this record.[1] I won't attempt to go through every one of those because apart from rendering too long an account, I want you to know that I have taken this matter into consideration beyond those specific allegations, as I said earlier, to encompass my thinking and position with respect to the entire metrology business of the Army.

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[1] See p. 638.

So some of my responses and proposed or actual actions are in that vein not necessarily directly in connection with the specific allegations which have been investigated.

The first of these, and I thought, frankly, the most serious of these has been allowed to, to an extent, or at least [illegible] particular by Senator Rudman, and that is the charge or allegation that the Army was seriously deficient in its calibration or quality and that a consequence of that deficiency was that the performance of weapons systems was questionable or might be degraded.

I don't know what the exact words were. I think that charge needs to be addressed first.

My answer to that is very simple. There is no basis for asserting significant degradation of calibration quality or consequential reduction in operational suitability of Army equipment.

The numbers that have been used have been very selectively and judiciously called out of other numbers. I can go into it in great detail, if you wish. But let me say to you I have no information, have been able to find none, from any of the operational commanders of the Army or from any other source that supports the notion that this quality question, if there is a quality question, is in any way interfering with the operational readiness or performance of the Army.

There are many reasons for that, but I think the one I call out most urgently to you, the calibration quality, is but a minor aspect of the performance capabilities and readiness of the weaponry.

A second point that I would make to you is the question of whether large sums of money could be saved by widespread adoption of Julie automated equipment and, in particular, by displacing manual calibration equipment and, further, in particular, by utilizing JRL equipment instead of other competitive automated equipment?

And I think the short answer to that is there is certainly some money that can be saved in this direction. The amounts, I believe, are less, considerably less than those claimed, at least in the most extreme versions of the claims that JRL puts forth, and they are equally, almost certainly more than those that have been asserted in the past by the various Army and Air Force studies and responses.

It is far from clear in that connection, from what I have been able to glean, that the JRL equipment, which has not been the lowest bidder in most of the competitive procurements it has been involved in—and there are not too many of those—is in cost tradeoffs but that is something that needs to be resolved in proper, open competition.

A little further on that point, it is not feasible to displace all manual calibration equipment and, indeed, Mr. Julie explained that his equipment is suitable for manual operation as well as automated, and the reason for that is that it's necessary. When it is used in a manual mode, it doesn't have the financial payoffs that it does in the automated mode. The reason for that is that there is just simply too much, too varied test equipment in the Army serving too many purposes. Some of it is ancient, goes back to World War II. Some of it may even be older than that. Some of the measurements are of quite unusual parameters that are not met by any of these automated equipments. Some of the equipments are just simply so involved in their capabilities that it isn't practicable to automate the calibration work.

On the other hand, there aren't that many of that kind of equipment.

Let me just say I believe that further automation can and will be employed to obtain legitimate cost savings. We recognize this fact but we also recognize, fortunately, that the information we need to make judicious decisions on isn't there. I will come back to that point.

The third issue that I think needs to be referred to is the question of whether JRL has been accorded an adequate and proper treatment with respect to the various procurement actions, protests and other Army contacts in which it has, by its own statement, been involved. The answer to that is probably not. The short answer requires some elaboration because this is not a one-sided matter. There is no evidence that the Army can find or that JRL has submitted that supports the allegation of kickbacks or anything like that. I think you asked that question, Mr. Chairman, and that is our answer.

Some Army procurement actions represent marginal interpretations, at best, of the regulations which, in sum, do not accord with the spirit of the procurement policies. And I will have more to say about that. I should interject, however, that I will refer to my own prior industrial experience in which I, among other things, always am in charge of procurement activities, and I simply will not, any more than I did then, accept marginal interpretations of procurement regulations as a way of practice.

I don't think it makes good business sense. It is not in accord with the procurement regulations, and I will have no part of it.

Third, and I have to say this, the methodology and the dogmatic viewpoints and the selective representations of JRL have not contributed to reasonable consideration of JRL offerings and protests. Now that's a fact. I don't say it to criticize him and I don't say it to support the notion that one should not be aggressive. I just say as a fact in judging what to do about this situation, there it is and it has affected, in my opinion, what has gone on.

Senator COHEN. Would you yield for a moment? Do you think that should be a factor as to whether or not the Army or any contracting officer awards a contract to a particular firm? Should that be even a factor to be considered under Army regulations, procurement regulations? Or should the fact that the contractor is arrogant or aggressive be totally discounted? Should any of those factors be involved in the Army's decision to select the best weapons system?

Mr. AMBROSE. None whatsoever, Senator Cohen. As I said, it is simply not an acceptable business practice but we have human beings, and I think it is a fact in some of these cases the human beings were affected by this. But it is not acceptable and we will not allow it to take place. That's all there is to it.

Senator COHEN. But you are saying it has in fact taken place?

Mr. AMBROSE. Yes, I say it is a fact in the investigations which, in my judgment, had a material bearing on what did happen.

Senator RUDMAN. Let me yield to one other question.

Chairman ROTH. I am going to ask that we let him complete his statement.

Mr. AMBROSE. It is always a fact there has been failure on both sides by JRL and involved Army officers to be adequately specific in setting forth the equipment and performance that is being offered, the terms of the offers, the basis for evaluation and the methodology of their economic analysis.

Neither side, in my opinion, has been adequately forthcoming in seeking to understand, clarify or resolve matters of fact. And I cannot get the past back. I can only tell you that is my opinion of the state of affairs. Each side has utilized or has resorted to what I have considered obtuse lines of reasoning to excuse failures. I don't excuse it. Certainly not for the Army side but there again is a fact we have to deal with.

That is why I say I don't believe Julie has had fair and equitable treatment.

The fourth point I think I have covered, was a question against the performance specifically in Europe, and I will just subsume it for the moment—we can come back to it if you wish—in saying I don't believe the Army in Europe suffers from operational readiness problems or performance any more than the Army as a whole, but there was a maintenance problem in Europe, there is a maintenance problem. It is not as severe as it was. It rose out of a neglect and deferral test equipment maintenance.

I am sure all of you are aware there has been a great deal of maintenance deferral of all kinds in the Army, but that is another day's subject and scattered organizational responsibility.

At some point—2 years ago, I guess—there was a reorganization, and this reorganization, and I haven't gone into all the history of this, flushed out some 13,000 pieces of test equipment that had been hiding up in one place or another and they were not prepared to deal with it.

They are trying to deal with it and I think they are overcoming it, but I think it would not be correct to say that they are out of the woods on this as yet. They are making progress. Most of the stuff, though, that was in these places is not the high accuracy kind of equipment. It is the long neglected multimeter or the old retired oscilloscope.

Some of the stuff was covered with grease and mud and had just been hidden out back and had not been used. They are trying to recoup these things. I think, frankly, they should get rid of a lot of it but I will come to that in a moment.

There was another question underneath that, though, that I would like to refer to and that was, I believe at times Julie Research Laboratories was told their equipment wasn't suitable, because it wasn't suitable for inclusion in advance for mobile field service.

I was in Europe last week myself and among other things took the time to go to a couple of these sites and concluded on my own, although it is supported by the Inspector General's findings that, in fact, the entire concept of mobilization calibration needs to be reexamined.

Most of these sites are being operated at the present time as fixed sites, what I would call fixed sites at least. Some of the requirement may be advanced but it is in fixed base facilities and in these places there is no reason why Julie equipment cannot do just as well as anybody else's, neither more nor less, and the whole concept of field mobile units needs to be reexamined and will be even if the equipment went in vans.

I see no reason why the JRL equipment wouldn't go in the vans as well as the other commercial equipment that I found in the vans already, and I think that was just not a correct response to the JRL.

The next point is, is this JRL Locost 106 as I believe it is called, suitable for Army calibration purposes?

And a second question is, is it uniquely superior for those purposes?

I first have to say that you need to be precise about which JRL Locost 106 you are talking about and I refer you in the statement to a copy of one of their sales brochures, which I believe is accurate and fairly current, which shows that under this single title equipment ranging from the price of $33,000 to about $145,000 are called out and they have a variety of capabilities.

As a matter of fact, this confusion of reference on both sides has led to mistaken conclusions and erroneous assertions by the Army and by, I believe, JRL, too. But from the Army's standpoint, there is no excuse for them not getting it straight what JRL equipment was being offered if they had any doubt about it.

It is my view that JRL equipment is really not that unique. There are other kinds of equipment that can do equivalent jobs. I also have the viewpoint that uniqueness is overly emphasized. If it will do the job, in my opinion, it really doesn't matter whether it is unique, not unique, high technology or not high technology, or other terms that have been used.

I think that can be illustrated—I won't belabor the point—if you would refer to a chart which I believe was called figure 3A-3B, which simply calls out the hardware that is in such equipment.

These particular callouts are the items proposed by the JRL, Fluke and Hewlett-Packard in connection with these earlier proposals for automated equipment. And you will notice, if you just glance at the typed numbers, that to a point JRL uses its own equipment and the others also use equipment which other competitors manufacture which I believe has substantially the same characteristics. JRL uses a Hewlett-Packard computer to control its equipment. But as you go from the low frequency kind of calibration, for meters and things like that, toward the more sophisticated oscilloscopes, you will find the JRL equipment more and more incorporates exactly the same purchased test equipment components as the other competitors use, or something very close to it.

It is hard for me to understand where there is a uniqueness claim in the hardware sense. JRL also claims that it has a superior faster method of software preparation and I won't get into very much of that unless you wish, but I think you need to keep a few things in mind.

The first and most important is that software programs need only be made once for all of the units and not for each use. So even if there are, and there may well be differences, it is not over time a large cost contributor.

There are arguments between software people—you may well have heard them in other connections—that go on endlessly whether doing it one way or another way is more efficient, takes less skill, helps the operator better and I would just have to say not that there is anything inferior and possibly there is something a bit better about the JRL stuff, but objective software people have given me, I believe, sound arguments on both sides of that that leave me feeling that it is not a very unique situation, the position that JRL has.

In any event, as I said before, the important thing, it seems to me, is, does it do the job and for the least cost? Whether it is unique or not, I guess, is more in the sales literature department.

Finally and regrettably, I have to say before I tell you what I plan to do about these things that, in my opinion, based on all the information I have been able to get, and supported by the GAO, who says more or less the same things, the Army simply does not have the data base even after very substantial effort to introduced improved reporting from which they can make cost savings analyses that have an adequate degree of credibility.

You have to keep in mind that we are talking about a data base that has in it at least three quarters of a million instruments and at least 1,200,000 annual calibration actions, all of which have to be taken into such data base and may well be 1,800,000 rather than 1,200,000.

You have to put into this a lot of things that haven't been talked about.

Mostly, you heard about labor costs and related training savings, but importantly you must remember calibration is only a part, and the smaller part, of the effort that goes on in these facilities we are talking about.

The biggest part is when you find the equipment is out of calibration or doesn't work, you have to fix it. And the large fraction of the time that is consumed in the maintenance. A large amount of the cost is in the spare parts stockage for this wide variety of instruments and in the facilities costs, things like that, that much has not been said about.

My position simply is that the criteria for these cost elements are simply not well established nor verified. The labor costs are actually among the best defined things we have to deal with, but if you put them into the calculations of those cost savings, they have to be put in with these other factors and labor productivity, which is a very crucial issue, is in particular not well defined, and labor productivity here means whether you can achieve anything like the proposed savings that Mr. Julie talks about when you are in the field and instead of a nice uniformed flow of the same kind of equipment requiring very little change or set up, or change from one instrument or another, whether you can actually obtain that, and the answer is you cannot.

The lack of these data bases and the lack of well-established information of this sort is what gives rise to this almost unbelievable range of opinions you have seen ranging from forecast of losses, which is official, and, in fact, nobody would buy and lose money, to very large cost savings potential.

And as I said, I believe the GAO's position is quite similar. We simply don't know. That is a very sad state of affairs.

I admit that. We are going to do something about it.

So I would like to come then to the thinking and effort that went beyond it and before—what do I conclude about all of this.

The first thing I conclude is that on a much broader front than just the calculation, the Army has got to do quite a number of things. I was very sorry to hear both Senator D'Amato and Representative Weiss apparently misunderstand the thrust of my proposal to have these things done. They have got to look at ways first of all of getting rid of the need for calibration in the first place by building it into new systems and that is, in fact, going on in many cases already, and I think can be incorporated in even more.

We need to look at the concept of field maintenance below the card level which is technical jargon for circuit boards which are, at the present time, circuit boards being repaired all the way down to the transistor or capacitor in the field.

I have a very strong suspicion that it would be much cheaper not to do any of that in the field at all but to simply use test equipment techniques which exist and are being used in some cases to decide that the circuit board is good or not good and either throw it away or send it back to the United States for repair. But that has to be sorted out and pinned down as to whether that notion is, in fact, correct.

Incidentally, if we sent the stuff back to the United States in those kinds of quantities, that would create a need in the United States for substantially more, highly automated test equipment because you could treat it in a more factory-like way.

We, the Army, need to reconsider its allocation of costs between initial acquisition costs around overall lifetime maintenance costs. Despite all the pressure there is to reduce the initial acquisition cost, and there is plenty, it seems to me entirely likely that additional investments in higher reliability parts, redundant circuit designs and things of that sort, could significantly reduce the maintenance cycle costs and in doing so, reduce the number of calibrations and the amount of repairs that is required. And these things, I believe, go well beyond the argument of which calibration equipment—I am saying, first, let's see if we can get rid of the need altogether for test equipment, and there will be some which continue to require external calibration and repair.

We need to modernize these devices, and there are designs available for that. So that the setup times and the ability to calibrate them is more nearly suitable for these automated calibration needs.

The whole industry is in a state of evolution along these lines. We need to get rid of this old junk that we are presently using and go to this modern kind of equipment and that, too, will both facilitate the use of our test sets and reduce the amount of test work being done.

I will come to a summary in a moment.

First, let me say also I conclude that we have got to reorganize further this GMD, as it is called, test equipnent and maintenance function. Even though it has gone through a certain amount of organizational straightening out and turmoil into that, in the past, I am not sure it has gone far enough.

We also need to see what revisions we must make to the relations and provisions for review in order to see to it that we get full and competent advocacy and monitoring of this area of test equipment.

It has apparently been a battleground, if you will, a source of confusion for quite some time. In part, I believe that is because it has not had a senior enough oversight in the Army, and I intend to see that it gets that.

We need, as I mentioned before, to make up our mind about this business of fixed base or mobile maintenance. As I said, I am not persuaded that mobile maintenance contents are valid. They are going to be reexamined.

I have already referred to getting rid of the old stuff.

I have asked the Assistant Secretary of the Army for installations, logistics and financial management, Mr. Pete Barnes, to head up this review. I picked him because the bulk of the things that are important here are in the maintenance and logistics supply area and in the cost analysis area, and he is the man appointed for that sort of thing.

I also believe that it should be taken but the Army as a whole rather than by DARCOM, where it has previously been managed.

He will be assisted by everybody that needs to assist him, particularly by the Assistant Secretary for Research and Development and by the Deputy Chiefs of Staff for Research and Development, Operations and Logistics.

They are the key players that have to make up their minds about these things. That study is going to take, in my opinion, 4 or 5 months if it is to be "valid and enforceable" and I have called for a report on this by March 15 of next year.

I cannot agree with the comments that say that this is one more bureaucratic putdown. I will earn or not earn my spurs in this job, but I will refer you to my past reputation for whatever assurance you want to draw from it that I am not likely at all to lend my name or participation to any such business.

The performance of the procurement function in this area of equipment is marginal in its adherence to the intended spirit of the procurement regulations. I have no present indication that this is a general phenomenon, but I certainly hear the comments and I will go see if I can find any more. Effective immediately, the calibration procurement personnel involved at MICON, are assigned other equivalent duties and this area of equipment purchase is assigned to another MICON purchasing branch.

It was commented by somebody awhile ago that the IG report contained punitive measures against the individuals. That is simply not a correct statement. But we do intend to carry out an in-depth view of the responsibilities and performance of the various individuals involved here and it will be done with due respect to all of the regulations in personnel matters, and it will be done under the direction of the Commanding General of DARCOM, Gen. Don Keith.

General Keith has also already approved the establishment of an element under the supervision of Lieutenant General Harden, the Deputy Commanding General for Material Readiness at DARCOM which will provide, we believe, temporarily at least until we can get the rest of it under control through these efforts I referred to earlier, will provide a more direct at the highest levels of DARCOM management and oversight of this area, including the issues that are involved in this inquiry. That has already been taken.

I mentioned before that we intend to look at what changes, if any, are needed in the implementation of the defense acquisition regulations that will contribute to improved performance generally in this area.

General Keith, Commanding General of DARCOM, again, will shortly issue a letter to all procurement functions reiterating the Army's intent to adhere to the spirit as well as the letter of this defense acquisition regulations and we mean it.

And, finally, the Ridge contract for AC calibrators of September 4 is being terminated for the convenience of the Government and that termination is not intended to evade in any way the prosecution of the Small Business Administration. Look at what took place.

Indeed, we encourage it because we want to know, too, what interpretations to make and what they make of this. It is being terminated because, in my judgment, the contract was not let with an adequate justification for the quantities involved. It was let with a judgment I disagree with with respect to the risks of having somebody not skilled in the business tear up an established instrument for the sake of putting it into a smaller box or at least in smaller quarters. It simply is not the proper way to acquire that kind of equipment.

It, also, I believe, incidentally, gives us our best chance to reconsider the point at which we want to install further automated test equipment in lieu of these manual calibrators.

In summary, I guess I would have to say, I am sorry to take so much of your time, Mr. Chairman, in reciting these things but I wish to assure you we have taken a very serious view of all this.

Secretary Marsh and I have very firm intentions that whatever needs straightening out is going to get straightened out. We have, I believe, done those things that we can do from this moment on. We cannot get the past back. We can only tell it like it is.

Chairman ROTH. Mr. Secretary, let me start out by saying that I agree with you that what is important is what action is taken, not what is particularly said at these hearings. And I do think that the findings, both of the IG and the GAO, show the need for some substantial action be taken by the management of Army procurement.

Let me go back to one question that has already been raised. The Inspector General has made a finding that the conduct of the supplier has impacted on procurement in this area. My question to you sir, is what action are you going to take both with respect to the individuals who were concerned with this procurement, who did not follow normal procedure—as it is a violation of the code to permit personal relationships to interfere with procurement—and how do we put into effect those management tools that will make it clear to individuals at every level, especially those who are responsible for procurement, that a buddy-buddy relationship is not supposed to be a factor?

Mr. AMBROSE. I will answer you in several ways, Mr. Chairman.

First, as I said a moment ago, we transferred the procurement function so as to break this relationship that we are talking about.

Second, we intend to investigate under the proper rules of the Civil Service Commission and any other applicable personnel policies the actions that have taken place and the people that were involved with the view to determining whether, in fact, some particular action is in order with respect to any one individual.

The Inspector General effort here was primarily to find the gist of it, if you will, not to make those kind of investigations until we had come to a proper conclusion on our own. But we do intend that investigation and it will start immediately.

I cannot tell you what the results of it are today.

We intend to make it clear in this letter I mentioned from General Keith, I intend to make it clear, I already have, but I will repeat it as often as necessary, that we simply will not accept that kind of performance on the part of our procurement people.

I guess I cannot tell you in an organization as large as this that there won't be an occasional deviation from that intent, but if we find it we will certainly go after it and get it out of there.

Chairman ROTH. I agree that you can never remove all incidents of this type, but I do want to underscore that I think it is important that the procurement personnel fully understand that the practice of letting the interrelationship interfere with proper procurement will be a base of action against that procurement official. I think until they fully understand it, nothing has been accomplished.

Mr. AMBROSE. If I may just add, I agree with you and I think the best message is examples, but, first, we have to be sure we are acting properly.

Chairman ROTH. I agree, the individuals concerned are entitled to a fair hearing, absolutely.

One of the things that bothered me, if I understood the thrust of part of your testimony, is that what Mr. Julie has offered is not, you say, unique but standard, readily available.

My question is, if that is the case, why haven't all these procurements been on straight competitive fixed-price bidding?

Basic procurement law requires that when you are purchasing commercial equipment, the award is supposed to be made on the basis of competition of at least three bids and then awarded to the lowest price.

If what you say is true, and this equipment is standard, why wasn't the standard competitive bidding practice used?

Mr. AMBROSE. When I say it is, if you will, I mean to say the various suppliers represent that they will each meet the specifications. In that sense, the units are equivalent. I was trying to divorce that from, if you will, sales claims of a unique methodology for getting the results.

There is no reason in the world why they shouldn't be procured against the appropriately drawn set of performance specifications and in the future, they certainly will be.

I cannot tell you why this was not done in the past. I cannot tell you why an adequate test was not arranged to settle this matter a long time ago. This thing has been going on for nearly a decade. The sensible thing to me, perhaps, I am speaking out of turn as an industrial type, would be to go get one of each kind and rack them up one against the other on an objective fair test and just have a horserace to see who won.

I cannot tell you why that wasn't done.

Chairman ROTH. My understanding is that has already been done at the White Sands Missile Center.

Mr. AMBROSE. No, I believe it is correct—General Solomon, correct me if I am wrong—that White Sands procured Julie equipment and was told to compare it against manual methods.

I believe at other times they procure a Hewlett-Packard and the Fluke but I am not aware there was the kind of standardized tests——

Chairman ROTH. What do you think is appropriate if the IG made a finding that this particular supplier had not had full or fair opportunity to compete?

Are you suggesting that now it would be appropriate for these various techniques to be tested in an independent testing?

Are you going to be recommending that?

I think you heard a number of Senators are concerned this equipment should be given a chance to demonstrate what it can do.

Mr. AMBROSE. First, I am not aware that there is any available remedies for these way past actions because all of them in turn have been terminated for one reason or another except for this Ridge procurement which, however, is not the forum we are talking about.

That is for manual, at least it was for manual units of a single kind. So there is not an open, at this moment, contractual forum where this could be accomplished, but I do intend to see if that is what makes sense.

I cannot tell you at the moment that I completely think it makes sense because I don't have sufficient information as to whether that is really what we need—anyone of these things.

That has got to be the starting point. We could run a field test of this kind and maybe we should. Perhaps that is the sort of thing that ought to be done just to quiet the question of overrepresentations of this sort.

I would rather not do it unless it had the subsequent purpose of fitting into a proper scheme of usage.

I am not foreclosing doing it.

Chairman ROTH. It is my understanding that as of today there are only two companies in the entire country manufacturing the type of calibration equipment that is Julie and Fluke. Assuming this to be correct, do you feel that it is in the best interest of the Army to allow only one company to remain in this field or should there be competition?

Let me point out, Mr. Secretary, there is certainly some very solid evidence that this firm has a good product. That finding has been made by the White Sands Missile Center; and it has been made, I believe, by the Diamond Laboratory.

We have in our file information that shows private companies, responsible large companies that say this calibration equipment is more efficient, costwise and otherwise.

Would it be in the interest of the Defense Department, the Army in particular, to insure there is more than one company in this field?

Mr. AMBROSE. Let me answer your question in several parts. I hope it is in the right order.

First, in general, I see no reason not to assume the JRL equipment works as represented. I am aware there have been certain rather esoteric discussions about it working or not working, but on the whole, I accept that the equipment works per its specifications.

Chairman ROTH. Could I interrupt? For example, I have a copy of a letter here from Grumman Aerospace Corp. where in answer to one of the questions, are there other off-the-shelf calibrators that will perform as well as the JRL Low Cost 106? The answer is, To my knowledge there are no other calibrators that will perform as well as the JRL Low Cost 106.

That is one example of what you are saying, that it appears to have a——

Mr. AMBROSE. I can't give you model numbers and companies, but I don't believe that it is correct that for the purpose of automatic testing of the kind of test equipment we are talking about, these are the only two suppliers. They may be the only ones that appear before the Army, but in the companies I have been with, other manufacturers have produced and supplied this kind of equipment generally. It has been my experience also that within a single company, from one division to the other, well-meaning, firm, different positions are held as to the value of one versus the other. It is not a simple question, really, because the test equipment varieties come into play as to just how important one feature or another of these is.

I don't believe we are faced with a Fluke or nothing, if you will, situation here. I would have to do considerably more research, though, before I would be prepared to tell you what the complete gamut of this kind of equipment is. I think you should also understand the large quantities of test equipment to be calibrated are relatively low accuracy, poor accuracy. The biggest single group, I think, representing well over a third, perhaps as much as a half—it is hard to get good hard figures—are instruments of multitesters, multimeters, that kind of thing, that has accuracies in the general range of 2 to 5 percent. These instruments are typically used for the most part by technicians who want to know whether a circuit is operating or not or who only care rather broadly to know what the parameter is.

I believe the particular thrust of the Julie equipment is its very high accuracy and in this field it may well be that there are only these one or two or three suppliers, but for automated testing for large cost savings, given the potential for that, it is not often that you need this high accuracy at all. It is not at all clear it is the most efficient way of accomplishing routine factory testing, large quantities of routine kinds of test equipment. I don't have the figure in front of me, but in one breakdown, which I don't want to put too much reliance on, but I think it is generally in the right direction, the very high accuracy equipment was less than 4 percent of the total numbers of test equipment. It is not at all clear to me, frankly, that even Mr. Julie would represent that he would test these in an automatic mode because these very high accuracies require very careful calibration, tracing back to the National Bureau of Standards references, things like that.

It is quite an elaborate process. His equipment is capable of doing it, as I understand, but it is not the same as automated testing. You will find in most factories and service laboratories of this kind of test equipment setups that are of great variety and can be obtained from a great number of companies

So I believe it is correct to say JRL has combined in one instrument or one set of instruments both high accuracy and automated testing. That may well be a direction to go, but I am not completely convinced it is the most economic way. But that is not to say his equipment doesn't work. So far as I know, it does work.

Chairman **Roth**. I am not blaming you because you have only been here a brief time, but I must say from the standpoint of the Army, if you go back to 1974, there were recommendations made by various groups that the Army should do something about automatic calibration. It deeply disturbs me that 8 years later we seem to be no further along than they were, say, 7 or 8 years ago.

My time is up.

Mr. **Ambrose**. I wouldn't want to say it disturbs me more than you, but I think it would come pretty close to that.

Senator **Cohen**. Mr. Chairman, I would reiterate your sentiment. It seems the Army has sent an unarmed man over the hill or over to the hill, and I mean unarmed by experience and certainly not by capability. I am well aware of Mr. Ambrose's capability.

In fact, I supported his nomination before the Armed Services Committee for confirmation.

I might say, Mr. Ambrose, part of the difficulty I have is the suggestion that there has been a wrong done, or a lack of fairness extended to Mr. Julie and yet there doesn't seem to be an appropriate remedy.

The difficulty I have with saying we are now going to start over is that the Army doesn't have a data base in which to measure the effectiveness and cost savings of competing calibration systems. To say that the Army is going to start over after 7 years may be too late since Mr. Julie might be out of business next spring when this is completed. That is what strikes me to be the fundamental inequity. The Army is only now recognizing the fact that an inequity has been done. Yet by the time an investigation is conducted, Mr. Julie may be out of business.

That to me doesn't seem particularly just if you adopt the concept of justice of every man being given his dues.

I think everything ought to be done to keep Mr. Julie in business until such time that the Army investigation is completed. I am not in favor of corporate welfare. I am struck by my own past experience. We had a company in Maine that manufactured machineguns for tanks. This company was in competition with a Belgium firm. According to a New York Times article, a deal had been made behind closed doors in the White House that would award a contract to the Belgium company as a sweetener in return for their purchasing F-16's over the French Mirage. The story was denied by the White House and also by the Army.

Through a year-and-a-half investigation, we found that all of the criteria that were established by the Army to support its award to the Belgium firm didn't seem to hold up. For example, we found the Army maintained the Belgium weapon fired at 9½ rounds per second, compared to the 7 rounds for the Monmouth Co. Then we went back and looked at the Army regulations and the optimum firing rate. The optimum firing rate specified by Army regulations was 7½, not 9. After further examination, I came to the conclusion that a deal had, in fact, been made. In my judgment, this deal was not, however, made fairly.

Now, aside from that, I come back to the Julie case. JRL is a firm which has a good reputation, from all I can see, that has been done an injustice. We are told we don't have any choice at this point but to try to start from scratch and hope we can develop better systems for the future. As I said earlier, I don't think that is particularly fair.

Let me come back to the Ridge Corp. My understanding is that Ridge was awarded an Army contract. Was JRL in competition for that contract?

Mr. **Ambrose**. I am sorry?

Senator **Cohen**. Was Julie in competition with the Ridge Co.?

Mr. **Ambrose**. Julie was one of four competitors. Ridge was another, yes.

Senator **Cohen**. So now we have an Army determination, as you mention at the end of your testimony, that the Ridge contract never should have been let for whatever reasons.

That brings me to another question. Was a preaward survey done in this case before the award was made to Ridge?

Mr. **Ambrose**. I am under the impression that the reliance was placed for the most part on prior knowledge of most of, if not all of these firms. Is that not correct? Yes, there were preaward surveys of a sort.

Senator **Cohen**. Wait a minute. Was a preaward survey conducted for the Ridge Co., according to Army regulations?

Mr. **Ambrose**. General Solomon, do you have that information?

General **Solomon**. My understanding is the contracting officer did make such a survey.

[Subsequently, the following letter was received:]

Department of the Army,
Office of the Secretary of the Army,
Washington, D.C., November 16, 1981.

Hon. William V. Roth, Jr.,
Chairman, Committee on Governmental Affairs,
U.S. Senate, Washington, D.C.

Dear Mr. Chairman: During the hearing your Committee held on November 5, 1981 on the Defense Acquisition Process, Major General Robert B. Solomon, Deputy The Inspector General (Investigations, Assistance and Compliance), in responding to a question raised by Senator Cohen, stated that a pre-award survey had been made in the case of an award for 53 AC calibrators to Ridge Incorporated (page 99 of the hearing transcript).

Since the hearing General Solomon has determined that his answer was incorrect and that Senator Cohen's understanding that a pre-award survey was waived in this case is correct. General Solomon's response was based on his recollection of the investigation testimony of Mr. Charles Graham (Pre-Award Manager, Procurement and Production Directorate, United States Army Missile Command, Redstone Arsenal, Alabama) as having included a comment that he had accomplished an in-plant pre-award survey of Ridge Incorporated on May 13, 1981.

In rereading the testimony General Solomon discovered that this pre-award survey was for a similar (but unrelated to the 53 calibrators) contract. Based on the May 13 survey, and another survey accomplished prior to the 1980 contract, Mr. Graham recommended waiving the survey for the contract which, as the Under Secretary of the Army testified, has been terminated.

General Solomon regrets having erred in his response.

I am taking the liberty of providing a copy of this correspondence to Senator Cohen.

Sincerely,

CHARLES D. FRANKLIN,
Major General, GS,
Chief of Legislative Liaison.

Senator COHEN. Would you see to it that a copy of that survey is submitted to this committee for our review?

Mr. AMBROSE. Yes.

Senator COHEN. The language you used, Mr. Ambrose, was that the Ridge Corp. contract is being terminated for the convenience of the Government, is that correct?

Mr. AMBROSE. Yes.

Senator COHEN. When contracts are terminated for the convenience of the Government, is there a penalty paid to the contractor under those circumstances?

Mr. AMBROSE. The contractor who has the contract is usually settled on shown that the Government is obliged to pay. It is not a penalty as such.

Senator COHEN. What are the costs the Government is required to pay to the contractor under this termination?

Mr. AMBROSE. Those costs he can show you he has incurred up to that point, which the Government was obliged to pay. In this case it would, I believe, be largely the costs related to obtaining and qualifying a first article instrument and incidental costs of preparing for training and manuals. But I don't have exact information and can't get it until we actually receive some return from this contractor.

Senator COHEN. When you receive that information, would you also supply that to us for the record?

Mr. AMBROSE. Surely.

[The information referred to follows:]

This competitively negotiated contract was awarded on 4 Sep 81 to the low responsive, responsible offeror (Ridge instruments) in the amount of $612,140.00. Julie Research Lab was another responsive offeror who submitted the third low offer in the amount of $708,548.00. The contract, terminated by direction on 5 Nov 81, contained the Termination for Convenience clause (DAR 7-103.21(b)). This clause obligates the Government to pay the total of:

(a) The cost incurred in the performance of the work terminated, including initial costs and preparatory expenses applicable thereto.

(b) The cost of settling or paying claims arising out of the termination of any subcontracts or orders.

(c) A sum as profit on any of the above which is determined to be reasonable.

(d) Costs associated with termination settlement, including actual, legal, clerical and other expenses necessary for the preparation of settlement claims and data with respect to the terminated portion of the contract and the termination and settlement of subcontracts thereof, together with reasonable storage, transportation, and other costs incurred in connection with the protection or distribution of property allocable to the contract.

The exact cost of the termination is not known at this time but will be determined after Ridge submits its termination claim, costs are audited, and a final termination settlement negotiated.

Senator COHEN. Did you finally come to the conclusion that Ridge was merely modifying products of the Fluke Corp., and thus was in violation of the small business set-aside requirement of the contract?

Mr. AMBROSE. I am not really proficient in determination on the small business side, and since it is an open matter which, as I said earlier, we prefer be brought to a conclusion, I guess I would rather not comment on that.

My position was a matter of engineering judgment, that it didn't make sense to incur the risks of tearing up a precise box of this sort in order to squeeze an inch or 2 out of the dimensions and incur the possibility that we would have some prolonged testing and development problem arise when the Government only wanted to get a working high-precision standard.

Senator COHEN. Let me go back to the Ridge Corp., again. If JRL was in competition for that particular contract award, and given the fact that the Ridge contract has been terminated for the convenience of the Government, why wouldn't it now be open for the Army to go back and allow Julie to complete the contract?

Mr. AMBROSE. If there is to be a reprocurement, Julie will surely be accorded a fair——

Senator COHEN. Why would there not be a reprocurement?

Mr. AMBROSE. Because as I said earlier, I want to take advantage of that situation to have reconsideration of whether to introduce automation at this point to some degree.

If I am not mistaken, Julie, in particular, offered an alternative that had just that capability. I consider that it is well worth taking a look at.

Senator COHEN. When did you make a determination to terminate the contract?

Mr. AMBROSE. That was made yesterday.

Senator COHEN. In all fairness to you, sir, you have only been on the job about 2 or 3 weeks. But don't you think the timing of the determination to terminate is suspect given the fact that this hearing was coming up.

It just strikes me that something ought to be done to correct the inequity that has been done to Mr. Julie. I would suggest to you that the Army look at the possibility of keeping JRL alive. If the firm goes out of business, the Army is then left with no real competition. This contravenes what the Secretary of Defense is talking about with respect to dual sourcing. He was just downstairs in a meeting which I attended, saying DOD is going to review its procurement practices and strangle at birth those systems which are not necessary, inadequate, and not cost-efficient.

There was an article that appeared in the Washington Post some time ago by Mr. Morton Mintz, and he pointed out that JRL's competitors sell calibration gear to the Soviets. In the end the Army brought automated equipment from the Fluke firm, found it didn't work, and then invited bids for manual calibrators, the very kind they found inadequate 30 years earlier. Is this accurate?

Mr. **Ambrose**. I really don't have enough personal knowledge to agree or disagree. It should be again noted that these equipments were not compared on a single apples to apples basis. A lot of the statements are being made by inequitable or differing tests.

Senator **Cohen**. I am for the record going to refer to a document here. You can correct it again with documents from your own file.

The document I have here shows a recommended waiver of the preaward survey for the award you made to the Ridge contract. I think that shows there was some measure of violation in the spirit, if not the letter, of the law. The purpose of a preaward survey is to determine a contractor's reliability, since they haven't performed in the past. Yet in this case, the preaward survey was recommended to be waived. It seems the pattern is inconsistent.

Mr. **Ambrose**. If I may say, again, I support the notion that there is a pattern that is not consistent with the spirit of the regulations. I didn't feel it was necessary to address each event in order to assert that. Certainly I am prepared to go further if it is necessary.

If I could respond to two points you made, actually, the first is we will, and it wasn't intended, and perhaps it didn't come through clearly, take a good hard look immediately as to what we can do with respect to, what we will do with respect to these calibrators that were the subject of that Ridge contract that has been terminated, as to whether to reinstate it, and open it for competition on a different basis—not reinstate the contract——

Senator **Cohen**. In what timeframe are you talking? If its months, JRL will be out of business.

Mr. **Ambrose**. I haven't set an exact time. I see no reason why that need take more than a week or two. As to whether Julie then is the beneficiary, that remains to be seen. Julie was not the second lowest bidder in this particular procurement. That is a matter for the marketplace.

Senator **Cohen**. Can I interrupt? I know my time is up but I would like to address one last issue if I may. As we have determined in the previous two hearings, some firms deliberately underbid in order to buy into the weapons system contract. We found that the Pentagon also underbids by lowering the estimate of inflation. Then we in Congress are presented a bill for a much higher cost system. It is hard to determine why the lowest bid in this case involving JRL and Ridge is taken to the exclusion of other factors.

You indicated before that the Army does not have an adequate data base to find out whether or not these calibration systems would, in fact, save the Government money. So how can the Army determine which firm's proposal is most cost-effective without the benefit of a data base? Without the data base, how can the Army simply say that the firm with the lowest bid will have the best product?

Mr. **Ambrose**. Again, without supporting the conduct of the procurement in any other respect, it was a firm fixed price contract and under the procurement regulations on that base the lowest bidder wins; all others being made technically acceptable, and they were.

Senator **Cohen**. Are you saying that the Army doesn't take into account any other factors such as past performance, capability, or technical expertise when awarding a contract?

Mr. **Ambrose**. Senator, regrettably they are not. They are not factors that are entered into to the same degree, or in the same way. Once these bids have, under the regulations, become technically acceptable, then the low bid wins. That is the way the procurement regulation is. I am neither attacking it nor defending it. There is no provision for saying, "Ah, but we think so and so is a better performer."

Senator **Cohen**. You mean to say if someone submits a low bid, you don't take into account the past reputation, past performance, or credibility of the contractor? If somebody submits a bid, you simply let the contract go without considering any of these other factors?

Mr. **Ambrose**. In this instance, we are buying a black box to commercial specifications, plus militarization of these things, the performance of the contractor would ordinarily not be evaluated.

In large systems, it is evaluated in the management considerations to some extent. But I express a personal opinion. I don't think it is enough taken into account, but there are limitations as to how far you can go.

Senator **Cohen**. It has to be the lowest responsible bidder.

Mr. **Ambrose**. Lowest responsible bidder.

Senator **Cohen**. And it takes into account technical expertise and past performance, such as that kind of analysis made in the preaward surveys.

Mr. **Ambrose**. In this case, without standing on the side of the procurement action itself, those steps were supposedly all taken into account.

Senator Cohen, I certainly support improvement in the direction you are talking about. I am not the world's expert on all of the details of these procurement regulations. I believe there are limitations within which you have to operate now. I would certainly be more than happy to look further as to what we could do to take better account of performance.

If I might just address one other point. The timing of course leads exactly to the comments you made. I think I would probably be equally subject to a comment if I had delayed until after this meeting not to take this action. I have done my best to both get the material in hand on a timely basis and render judgment in those matters where I felt I was on sure ground so as not to take any longer than has already taken. If that creates an illusion, I assure you it is only something I couldn't avoid.

Senator **Cohen** [presiding]. Senator Rudman.

Senator **Rudman**. Mr. Ambrose, I wonder if you are aware of the fact that when the Ridge contract was awarded and protest was lodged by Mr. Julie, the Army had to find a way to get around that protest if it wanted to go ahead with that. Of course, they found a very good reason. The waiver under the statute of that protest was granted because the Army stated affirmatively that there was an urgent need by the Army for the program. Now that is in the record. That is how the protest was avoided. That is a legitimate approach obviously to avoid problems. Question, what happened to the urgency?

Mr. **Ambrose**. I am not a supporter of the defense that they made.

Senator RUDMAN. I would like you to amplify that for the record. You weren't there at the time and we have great respect for you, but I really want some answers. I get the feeling sometimes that the people who could give the answers sometimes don't get to these hearings. I would like an answer to that.

Mr. AMBROSE. I will, for the record, provide you with the exact basis on which that statement was made. The material that was provided to me did not support that statement. That is why I am not supporting it myself now.

Senator RUDMAN. I think it is part of the inquiry you don't want to look into.

Mr. AMBROSE. It certainly leads me to say at least the spirit of the thing is not being adhered to.

Senator RUDMAN. Exactly.

[The information referred to follows:]

The "2nd Manual Buy" was a 1980 procurement of 87 complete sets of manual calibration equipment (AN/GSM 286 and AN/GSM 287). JRL was solicited but chose not to bid. JRL protested this procurement action to the GAO. The contract was awarded prior to resolution of the protest due to urgency of need. The protest was subsequently denied in June 1981. Several components of these systems were no longer manufactured and substituted items were procured under separate contract.

AMCC/ATSG did attempt to obtain early delivery of the manual systems from the contractor. The items were delivered in advance of contract schedule, however, they were not complete. A delay was caused by the necessity to reprocure several items as they were no longer being manufactured. In procurement matters, delays are often encountered; this does not establish that the urgency has vanished or was never present.

Senator RUDMAN. I am very interested to have you say you disagree with my contention that we don't have that good a situation Army-wide right now in the field of calibration. You said that as part of your informal opening statement. You know, if that is so, that is very good news. I don't think it is so and I want to discuss it with you. I would like to know on what empirical basis you made that conclusion and I want to discuss some studies with you that I know about.

That statement was unsupported by any fact whatsoever, Mr. Secretary, and I would like a factual basis for your statement made at the beginning of this hearing that the Army status of calibration Army-wide is, in fact, in a good state of readiness. I would like to know the basis of that. If you can't give it to me today—I know you are new on the job—I would like to have it for the record.

Mr. AMBROSE. I will give you a more complete statement for the record, Senator. Let me say though, this statement arose out of the allegation that in some way the calibration quality of the Army was—64 percent is the number as I recall it—and I tried to find out where such a number came from. I will give you for the record an explanation of where that number came from. It came from a selective extrapolation of data from a few CONUS laboratories, Continental United States, laboratories.

Whether the information is correct or the calculations are correct, I would like the opportunity to check it.

But I went back to find out what, in fact, the calibration quality standards were and they are contained in brief form in figure 1 of this handout that I didn't refer to, and they are presented for all three services. I invite your attention to the last part, the next to the last and third from the last items because the criteria which are established for acceptance of calibration measuring the quality are that in the case of the Army there be an average of 90 percent of the equipments, the instruments, in calibration over the calibration period and that at the end of the period there be no more than 75 percent of them out of calibration.

Although you can have a statistical field day, I find, when you get into what that means. Basically it boils down to the fact that 90 percent of Army's calibrations are within the calibration requirements at any instant at a time. That is why I say it is not, in my mind, a question of poor calibration quality. Extrapolating that to operational quality is a long, long road.

[The information referred to follows:]

Under the provisions of Technical Bulletin 43-180-1, authority has been granted to commanders of Research and Development, Production and Procurement, and Training & Evaluation installations as well as the Army Standards Laboratory and Facilities Engineering Activities to establish calibration requirements as well as intervals based on equipment applications.

Out-of-tolerance rates for DARCOM internal laboratories were listed in Section Two of Fourth Quarter Report fiscal year 1978, AMCC. In computing or estimating his 64 percent reliability figure, Mr. Julie omitted all bar graphs from the internal depot mission report except five. These five that remain could be used to obtain an in-tolerance percentage of approximately 64 percent. This Fourth Quarter, fiscal year 1978 report gives the combined averages from all depots, for the entire fiscal year 1978. The figures are as follows: first quarter, 24 percent; second quarter, 20 percent; third quarter, 21 percent; and fourth quarter, 20 percent.

Using these figures, the combined average out-of-tolerance would be 21.25 percent and the in-tolerance percentage for fiscal year 1978 would be approximately 78.75 percent for these calibration laboratories.

White Sands Missile Range as well as numerous other internal depot/laboratory operation reported out-of-tolerance percentage rates as high as 40 percent. These activities, however, are internal operations only—their commanders determine autonomously their acceptable in-tolerance levels—and do not reflect on the mission performance of calibration and repair units supporting the field Army. These DARCOM internal calibration laboratory operations have the authority to establish or adjust their calibration requirements as well as basic intervals for calibration. Many items may not be calibrated until time for use, while others may be given intervals which far exceed the 120 day requirement found in the field Army. This would have a definite effect on out-of-tolerance rates. This factor alone divides the internal laboratory function and the field Army function into two separate entities, and there has been no data gathered from the field by Mr. Julie. Notwithstanding, the Julie-Hafer Cartoon Books injudiciously imply that these two functions are synonymous. They are not.

Mr. Julie extracted data from reports of five laboratories and apparently disregarded others in the AMCC report. These reports were from internal depot laboratories containing a high density of the type of TMDE referenced in the previous paragraph. Using only these numbers, a person could establish an approximate in-tolerance figure of 64 percent. However, if all data from every internal depot were to be incorporated into the computations, the result would be higher than 64 percent.

The Julie estimate appears to be the product of a selected data base and not the entire data available to him at the time. Regardless of what in-tolerance figure is decided upon, the AMCC report was a measurement of internal depot type calibration/repair operations. Mr. Reib's impressions of the applicability of these numbers, as conveyed to Mr. Julie in discussion of Mr. Reib's military experience of some years before, do not constitute an authoritative assessment, one way or the other, of current activities of calibration/repair units supporting the field Army.

Calibration Not Required (CNR) is defined by Technical Bulletin 750-25-1 as a term applied to an instrument not requiring calibration because of its use or application. An example would be a tube tester, a dial indicator gauge used only as a zero indicator, an instrument used for nonprecision testing/measuring, or an instrument monitored by a calibrated instrument. Items classified as CNR, as well as all other items of TMDE used in the maintenance of the field Army's equipment, are listed in Technical Bulletin 43-180-1.

Calibrate Before Use (CBU) is defined by Technical Bulletin 750-25-1 as a term applied to an instrument held in temporary storage. When the item is required for use, it will be calibrated prior to the specific operation.

A review of Technical Bulletin 43-180-1 reveals 328 pages of TMDE line items with approximately 20 items on each page. This equals an approximate total of 6560 line items of TMDE (20×328=6560). A page by page count of CNR items reveals 1505 items of TMDE out of the approximate 6560 total items of Army in the field TMDE that has been classified as CNR. This would equate to only 22.94 percent of the total.

Under the provisions of Technical Bulletin 43-180-1, authority is granted to commanders of Research & Development, Production & Procurement, and Training & Evaluation installations as well as the Army Standards Laboratory and Facilities Engineering Activities to establish calibration intervals based on equipment applications.

The 64 percent reliability rate mentioned by Mr. Julie was based on Section 2 of the AMCC Fourth Quarter fiscal year 1978 Report on DARCOM Internal Depot Calibration Missions.

Mr. Julie did not use all of the available data from the report referenced above in computing or estimating his 64 percent reliability figure. The five locations from which he extracted data are represented by the five bar graphs that he left in the internal depot mission report. All other graphs were removed. The five remaining could be used to obtain an in tolerance percentage of approximately 64 percent.

Mr. Julie testified that all of his data had been gathered from internal laboratory environments and that he had no data from the Army in the field.

The estimate that only 20 out of every 66 pieces of Army equipment will be in working tolerance was developed using the 64 percent figure selected by Mr. Julie to represent equipment still in tolerance at the end of the calibration interval.

It was not valid to assimilate the internal depot calibration mission with the mission of those units supporting TMDE belonging to the Army in the field. Because of the specialized mission of the depot calibration laboratories, some items of TMDE may not be used for periods of 12 to 18 months. This test equipment, at the discretion of the laboratory, can be given extended calibration periods or marked CBU.

According to information available there are TMDE items such as tube testers and indicator gauges which in fact do not require calibration and are classified as CNR by Technical Bulletin 43-180-1. Equipment of this nature composes approximately 23 percent of the field Army TMDE, far less than the 50 percent cited by Mr. Julie.

The statement that 50 percent of the Army's equipment is "officially neglected" is purely an estimate arrived at by Mr. Julie from his assessment observations of work procedures at some DARCOM internal depot calibration facilities. He gave no indication in any testimony that he had visited a field Army calibration operation. In fact, he testified he had no data on the Army in the field. Mr. Julie's allegation however, injudiciously implies that the two functions are synonymous.

The statement that only 20 our of every 66 pieces of Army equipment will be in-tolerance was calculated using the previously discussed 50 percent factor, and an estimated figure of 64 percent reliability rate.

The 50 percent automatically excludes 33 of the 66 items. The number 20 is approximately 64 percent of the remaining 33. Although the correct reliability rate of 78.75 percent would add a few more items to the in-tolerance group, the real error is in the estimate of 50 percent. That reduces to one half any amount of TMDE with which the user decides to work.

This 64 percent number as well as the other percentages mentioned in the cartoon books (95 percent, 80 to 85 percent etc.) are arbitrary mathmatical concepts that have little real world significance in the sense of indices of weapons system targeting accuracy—the readiness-oriented implication cited in the cartoon books. The 95 percent number was the accuracy level which the Army has expected manufacturers to maintain in their own factories while making Army equipment; for that purpose and in that situation, 95 percent remains the accuracy level—it has not been reduced.

Based on available information, it appears that it is true that the Army elected to move from a 90-day basic calibration interval (BCI) to a 120-day BCI, at least for the field Army. The 90-day BCI equated, statistically, to an "85 percent accuracy level"—where accuracy level means: after 90 days, 85 percent of the TMDE items presented for calibration would still be within allowable calibration tolerances (within their error budget). The 120-day BCI resulted in an 80 percent accuracy level, which was determined (by those with authority to do so) to be an acceptable level of accuracy for all of the field Army TMDE population. The 80 percent accuracy level was considered to be an acceptable trade-off in order to achieve maintenance dollar conservation through lengthened BCI. Finally, it should be understood that a 120-day BCI does not mean all TMDE would be calibrated every 120 days; rather, some multiple of 120 days would apply to each piece of TMDE. Whether either of these determinations—the 80 percent accuracy level or the dollar savings—has proved true is not established at this time, probably because of the intervention of other factors, Army-wide. For example, it is not known with precision whether the 120-day BCI is an effective base line because calibration-and-repair backlogs (TMDE items not receiving calibration until later than specificed because of queuing at calibration-and-repair sites) and unknown quantities of TMDE exempt officially and unofficially from calibration, act to distort statistically the overall Army posture. It is estimated, but not really known that the Army has 700,000 pieces of TMDE—each of which presumably should require calibration each 120 days (or some multiple of 120 days for a particular model). But all DARCOM internal mission TMDE are exempt from this presumption, even though internal mission TMDE items are part of the reported Army quantity on hand. Also reported is the number of calibrations actions. From these two sources (all-Army quantity of TMDE as reported and all-Army reported TMDE calibration actions), it is possible to demonstrate mathematically and erroneously, that the Army as a whole calibrated annually, over the period 1978-79-80, only 67 percent of its TMDE. This exercise, in turn, could be stated as "The Army is only 67 percent in calibration", but such a number would be meaningless. Certainly such a number does not mean that only 67 out of 100 Army missiles fired will hit their targets, and the other 33 missiles will miss because their system TMDE was out of calibration tolerances, as implied in the cartoon books.

It is therefore not correct that because the basic calibration interval was lengthened in 1973, or beause the item calibration interval has been lengthened for certain models of TMDE that there has been a downward trend, as Mr. Julie alleged, from 95 percent to 85 percent to 80 percent to 64 percent in actual accuracy of TMDE Army-wide. In the opinion of the IG Inquiry there is no authoritative Army-wide percentage, and development of one would not be helpful to the real problems of calibration and repair; the Army is not at 64 percent calibration accuracy with resulting degraded readiness.

Senator RUDMAN. You would agree that the question also relates to what percentage of the equipment is in fact calibrated within the time frame that specifications say it must be calibrated.

Mr. AMBROSE. There are certainly departures from adherence to the calibration frequency, but on the whole, the calibrations occur every 120 days or some other period which has been shown to be adequate for the same accuracy of calibration. I relied on my statement about operational effect for the absence of any evidence whatever that there is an operational consequence of this and that, I believe, is the responsible opinion of the Army major commanders.

Senator RUDMAN. Well, are you familiar with the recent assessments done for the Army by the Air Force Metrology Center at Newark Air Force Base in Ohio?

Mr. AMBROSE. Yes, to some extent.

Senator RUDMAN. That says a requirement of the Army is about 1.2 million calibration actions per year. Give or take some percentage points—that is what they told the Army—is that accurate?

Mr. AMBROSE. Yes, I believe.

Senator RUDMAN. They have gone on to say these actions last year were performed on approximately 700,000 of these units, maybe the same unit more than once, but 700,000 actions compared to a 1.2. million. How can you say that is a percentage good enough to give you confidence about what is out there in the field? That is my question.

Mr. AMBROSE. Excuse me, Senator, I believe the statement you are making to be understood 700,000 equipments which are subjected to 1.2 million calibrations per year so that there is not quite two calibrations per instrument per year.

Senator **Rudman**. Will you furnish that for the record, please?

Mr. **Ambrose**. Yes, sir.

[The material referred to follows:]

There are approximately 589,000 pieces of TMDE in the Army. These items received, on the average, 1.6 calibrations per year. The resulting 942,400 service actions do not include repair requirements.

Senator **Rudman**. As well as the field testing report you referred to that I don't have a copy of.

Mr. **Ambrose**. Yes.[1]

Senator **Rudman**. Finally, before I have to go over and vote, we have spent a good deal of time— I don't know how many hundreds of thousands of dollars, how much Army time on the Inspector General's report which I commend you for, sir, which is first rate and which has cost a great deal of money to prepare and we are talking about going on and on and on with more evaluations.

Tell me—and let me point out to you not one job of Julie is in the State of New Hampshire—what would be so difficult about buying a vanload of their equipment, putting it out on a test site and coming back and see if it works as well as they say it does? Why do we have to do things in a difficult way when I point out to you this afternoon at 3:30 that you and I are going to sit down and talk about a weapons system by a major American corporation that is three times the cost it was supposed to be, 2½ years late, and will not meet the threat of the Soviets in 1987 and yet the Army says, you know, we have to go on and continue to build it? Why can't Mr. Julie put out a van of his equipment for the low amount of money we are talking about, get through with all the talk and conversation, and let us see if it works or completely fails?

Why can't we do that?

Mr. **Ambrose**. Senator, I don't have any problem with doing a fair test of Mr. Julie's equipment and the equivalent competitive equipments.

Senator **Rudman**. Thank you. I am going to turn it over; have you voted yet, Senator Pryor?

Senator **Pryor**. I have to calibrate myself over to the Senate floor and vote. I was wondering if we couldn't recess because I have a few questions for our Inspector General also, if I might.

Senator **Rudman**. We will stand in recess for five minutes.

[A brief recess was taken.]

Chairman **Roth** [presiding]. The committee will please be in order. I have one more question that I want to ask so in the interest of saving time, I will break in and then perhaps make two or three comments. You have been up here quite a while and I appreciate that, Mr. Secretary.

Mr. **Ambrose**. That is quite all right.

Chairman **Roth**. I would like to ask either one of you, perhaps it is more appropriate for the Inspector General, was there any evidence of fraud or illegal actions on the part of any Army personnel involved? Is anyone involved in the case subject to further investigaton and is any of the information developed by Army Inspector General being referred to any of the Army criminal investigative divisions for further review and investigation?

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[1] The field testing report, "Evaluation of the Army Calibration Program by the Aerospace Guidance and Metrology Center," U.S. Air Force, August 29, 1981, has been retained in the committee files.

General SOLOMON. The answer to all of those is no.

Chairman ROTH. No evidence?

General SOLOMON. No evidence of kickbacks and fraud in this investigation.

Chairman ROTH. Mr. Secretary, while we are waiting for Mr. Pryor, who has not had the chance to question either one of you, I would like to make three or four observations when he finishes, then you are free to go. I think there is a very broad consensus here on the committee that an injustice has been done Mr. Julie and that it is incumbent on the Army to see whether anything appropriately can be done under the circumstances.

I think people feel very strongly about this because he was a qualified bidder, he has a good product and it is unfortunate that his firm would be excluded from the competitive scene. I would also say that I think it is extraordinarily important that appropriate disciplinary actions be taken against those who are responsible for the fact that marketing techniques or aggressiveness was a factor in his not being permitted to successfully bid. As I said before, I think that it is important because we have got to make it clear to personnel at every level that the Army procurement regulations mean what they say and they are going to be strictly enforced.

I would also say, Mr. Secretary, that I think you have a great challenge and a great opportunity and while I am not personally acquainted with you, you have, I gather, an extremely distinguished background and a great deal of knowledge in your given area of responsibility.

It greatly disturbs me that in 1981, when we are being requested to increase defense spending to a trillion and a half in a relatively short period that we don't have many of the practices, and administrative policies in place, in this area of testing calibration systems. As I said earlier, it is a disgrace. It seems to me that 7 years after this matter first came up from people within the military, and from the National Bureau of Standards, that we find the Army in a position not much further along than they were 7 years ago. This put a great burden upon you.

Finally, what we are most concerned with is to what degree this case is typical of what is going on in military procurement. I think it is critically important that we put in place the internal administrative controls that insure that those on the procurement level will follow through. I have no doubt that the majority of Secretaries, Deputy Secretaries, administrative people, as well as the military, intend to do what is right, but good intentions are not what we need, we need the internal controls within this Pentagon to assure that correct procedures are followed.

I urge you to build in the controls that are essential for these purposes. I would like to call on you in 6 months or so, to review where we are at that time in these areas.

Mr. AMBROSE. We will be happy to review them at any time that is convenient to you, Mr. Chairman.

Let me say first of all, it is no pleasure to come over here and have to acknowledge these things I have been talking about. On the other hand, it is better to get this sort of thing behind us and do it as quickly as we can. I assure you we will. I am sure you are well aware we have to pay attention to all sorts of regulations and rules in both the procurement actions and personnel actions.

We will look to see what we can do with respect to the first point you made, which is something proper for this situation. I think we would all be ill served, however, and this matter would simply be perpetuated if we did not see to it that we constructed a fair and objective test and we are sure of the judges and the outcome and that it had a useful purpose.

I guess there is nothing more I can say than that.

Chairman Roth. As you review the rules and regulations by which you are bound, not only do I want to insure we follow the procurement rules, but I also recognize that we probably have a lot of rules and regulations that are obsolete and we shall be interested in having recommendations in that area as well to try to expedite your job.

Mr. Ambrose. Well, I certainly won't hesitate to tell you if I think we will benefit by some rule changes. There are too many of them, I agree.

Chairman Roth. Senator Pryor?

Senator Pryor. Thank you, Mr. Chairman.

Mr. Chairman, I would like to ask this question to Mr. Ambrose and then a question or two to the Inspector General, if I might. It seems like he has escaped our direct wrath this morning, temporarily.

You have just terminated a contract with Ridge, the Ridge Co. or the Ridge organization—what was the amount of that? How many dollars did that contract represent?

Mr. Ambrose. $680,000.

Senator Pryor. It is my understanding that the Ridge Co. also has a contract which was awarded in 1980 for 87 van sets—I don't know what a van set is—which was also protested by Mr. Julie. This contract was in the amount of $23 million. Is this contract still in progress or has this contract also been terminated?

Mr. Ambrose. That contract continues in effect.

Senator Pryor. How much has been spent under this contract?

Mr. Ambrose. I will have to give you that information for the record, Senator.

[The information referred to follows:]

Contract No. DAAH01-80-C-1643 is a Firm Fixed Price 3 year, multi-year contract. As of November 16, 1981, the administrative contracting officer has expended $10,717,900.00 in payments. It should be noted that JRL was solicited but did not submit a bid. JRL did, however, protest this requirement to the Comptroller General. The protest was denied (see B-199416, June 16, 1981). It should also be noted that this requirement was for calibration sets secondary transfer, AN/GSM 286 and 287; and calibration consoles. The vans referred to in the question were GFP items into which the calibration hardware was to be installed.

Senator Pryor. Could this contract be interpreted as was asked on April 9 or could it be ceased as was requested in April and then reprocured, the $23 million contract to Ridge?

Mr. **Ambrose**. Senator, I have not gone beyond the point of noting the GAO protest was denied. I know of no basis in the sense I use to terminate the current contract. It is my understanding that this is what the trade calls rack and stack assemblage of unmodified existing manual test instruments of various kinds and parts supplies.

I know of no basis for such an action.

Senator **Pryor**. If you are getting ready to commence with a major study on whether this should be manually operated and do away with calibration systems, et cetera, why are we going to do the study at the same time we are going to implement basically a cessation, let's say, of calibration as we know it today and why is this contract going to proceed at $23 milllon?

Mr. **Ambrose**. Well, I hope I haven't left you with the understanding that there is no place for manual test equipment because, in fact, I don't believe there is any possibility of getting away from it. The automatic equipment, I believe even Mr. Julie acknowledges, only serves a certain fraction of the whole. There are many varied test equipments to be calibrated and they have all sorts of characteristics.

These assemblages are intended, as I understand it, to serve the overall purpose.

Senator **Pryor**. Mr. Ambrose, was the $23 million contract awarded to Ridge by competitive bid?

Mr. **Ambrose**. I believe so.

Senator **Pryor**. Or was this another sole source contract?

Mr. **Ambrose**. We will check it but I am not aware that it is a sole source contract.

Senator **Pryor**. You will supply that, I hope, for the record.

Mr. **Ambrose**. Yes, sir. We can find it right now, I hope.

It was a Firm Fixed Price—Multi-Year Contract Award on a formal advertised basis.

Senator **Pryor**. May I then turn a question or two to Mr. Solomon, the Deputy Inspector General. When did you first hear about the Julie situation?

General **Solomon**. Senator, I returned from a previous assignment on August 24. I was assigned as a Deputy Inspector General on August 26. On August 28 I was designated as the single point of contact within the Inspector General's office for this particular case.

Senator **Pryor**. What happens in the Department of Army when a case like this floats around for 7 years, almost a decade and then finally the Inspector General's office becomes involved? What was the long delay?

General **Solomon**. Sir, I can only speak to that period of time that I personally have been associated with the case. However, there is no question in my mind I can substantiate this was an intensive, exhaustive study at great cost to the Army and it has been independent in every sense.

Senator **Pryor**. Senator Rudman just told me on the subway, I am going to borrow one of his stories, if I might, this situation reminds him—I should let him tell it.

Senator **Rudman**. You tell it. It is not that good actually.

Senator **Pryor**. It is good. The waiter walks by a table and someone says, waiter, what time is it and the waiter says "This is not my table."

With all due respect, Mr. Ambrose has been here now for just a few weeks. You have been here for just a year and we are trying desperately to find out what goes on in procurement and we can't seem to do it because neither of you seem to know the answers.

This question: Who, for example, was the contracting officer that signed off after the protest by Mr. Julie was given? Who was the contracting officer who signed off and said in effect that we have to have this because it is of such importance and we are in such a hurry for it that we don't want to pay any attention to this protest and will go ahead and award it sole source, who is that officer?

General **Solomon**. Mr. Robert Hawkins. I would like to correct something. I have not been here a year; I have been here 9 weeks.

Senator **Pryor**. August of this year. It is getting worse then, Mr. Chairman. Is Mr. Hawkins here today?

General **Solomon**. I do not believe so, sir.

Senator **Pryor**. We have a lot of calibrators out here in the audience. I wonder if he might not be here. I am sorry he is not. That ought to be the man we are talking to. Why did he sign this contract saying that time was of the essence to the degree we would not consider the protest filed by Mr. Julie, why was that signed?

Mr. **Ambrose**. If I may answer that, I think the best way to put that in front of you is to provide you with the exact piece of paper with the citation that was used rather than to speculate if the question is what was in somebody's mind. The official document exists and we will supply it to you.

[The information referred to follows:]

DRCGC-P (15 Aug 80) 2nd Ind
SUBJECT: Request for Approval to Make Award Under Solicitation DAAH01-80-B-0332 Prior to Resolution of GAO Protest B-199416 by Julie Research Laboratories, Inc.

Headquarters US Army Materiel Development and Readiness Command, 5001 Eisenhower Avenue, Alexandria, VA 22333 4 SEP 1980

TO: Commander, US Army Missile Command, ATTN: DRSMI-IZC-M, Redstone Arsenal, AL 35898

1. Inclosed is an original 1st Indorsement dated 29 August 1980, subject as above, together with basic letter, authorizing award under Solicitation DAAH01-80-B-0332, notwithstanding the pendency of subject Julie Research Laboratories, Inc. protest. As you were already orally advised, authorization to award notwithstanding the pendency of the companion protest of AUL Instrument, Inc., B-199416.2 was also signed the same day and SARDA advises that approval will be transmitted under separate cover.

2. Your attention is directed to the second and third sentence of the inclosed 1st Indorsement. Please furnish this office three (3) copies of the Notice of Award when issued to the protesters (one copy for this office, one copy for the General Accounting Office, and one copy to be furnished the Deputy Assistant Secretary of the Army (Acquisition)).

FOR THE COMMANDER:

Incl
nc

F. X. McKENNA
Command Counsel

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SARDA (15 Aug 80) 1st Ind
SUBJECT: Request for Approval to Make Award Under Solicitation DAAH01-80-B-0332 Prior to Resolution of GAO Protest B-199416 by Julie Research Laboratories, Inc.

Headquarters, Department of the Army, Office of the Assistant Secretary (Research, Development and Acquisition), Washington, DC 20310 29 AUG 1980

TO: Commander, US Army Materiel Development and Readiness Command, ATTN: DRCGC-P, 5001 Eisenhower Avenue, Alexandria, VA 22333

On the basis of representations set forth in basic correspondence, the requested authority to award pending resolution of the protest is granted. The Contracting Officer is to comply with DAR 2-407.8(b)(2) and (3) concerning notice of award to the Comptroller General, the protestor and others as appropriate. Copies of such notices should be furnished to this office.

Arthur Daoulas

Incl
nc

Arthur Daoulas
Deputy Assistant Secretary of the Army
(Acquisition)

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SMI-L

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND
5001 EISENHOWER AVENUE, ALEXANDRIA, VA. 22333

DRCGC-P

15 AUG 1980

SUBJECT: Request for Approval to Make Award Under Solicitation DAAH01-80-B-0332 Prior to Resolution of GAO Protest B-199416 by Julie Research Laboratories, Inc.

HQDA, SARDA
Washington, DC 20310

1. Inclosed is a letter dated 1 August 1980 from the Director of the Procurement and Production Directorate, US Army Missile Command, Redstone Arsenal, Alabama, requesting approval to make award under Solicitation DAAH01-80-B-0332 in accordance with the terms of DAR 2-407.8(b)(3)(i), prior to resolution of subject GAO protest. Accompanying that request is the Contracting Officer's Determination and Findings executed 30 July 1980 in support of that request.

2. Also inclosed is a copy of the administrative report prepared by the procuring activity which will be transmitted to GAO shortly in connection with subject protest. That report includes copies of all correspondence from Julie Research Laboratories, Inc. ("Julie") to GAO (Tabs B thru D) concerning Julie's protest of this procurement.

3. Briefly, the inclosed request indicates the solicitation was issued on 6 May 1980 as a 100% small business set aside for multi-year requirements for calibration sets, secondary transfer, plus related equipment, with options. Bids were opened 28 July 1980, and MICOM indicates that two responsive bids were received. Ridge Instrument, Inc. is the low bidder and AUL Instrument, Inc., the prior contractor, is second low. MICOM advises a preaward survey being conducted on the low bidder should be completed shortly.

4. In its protest to GAO, Julie contended prior to bid opening that they are a leading small business manufacturer of the most critical line items required and they are barred from consideration as a subcontractor for those items by the alleged restrictive nature of the Government specifications and the time restrictions established for preparation of a responsive bid. Julie also contended that the specifications violate the DAR in that they call for the furnishing of contract "end items" manufactured by large business concerns.

5. As the legal opinion in the inclosed administrative report indicates, the unstated gravamen of Julie's protest is Julie's desire to be named a subcontractor for seven of 511 required sole source components. That opinion documents that

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15 AUG 1980

DRCGC-P
SUBJECT: Request for Approval to Make Award Under Solicitation DAAH01-80-B-0332 Prior to Resolution of GAO Protest B-199416 by Julie Research Laboratories, Inc.

Julie's products are technically unacceptable for this acquisition/ because they are automated and the requirer, the US Army Metrology & Calibration Center, has no present requirement or need for automated equipment; Julie refuses to accept that position repeated to them at MICOM, DARCOM, and secretarial level.

6. The administrative report inclosed herewith details that the instant procurement is part of an overall procurement plan to replace overage Calibration Standard Sets, Secondary Transfer, and to obtain additional sets. Both that report and the inclosed request document why the requiring element, the US Army Metrology and Calibration Center, reasonably considers it absolutely essential that the current requirement be identical to the previous buy, because of various valid cost and time constraints underlying the Government's specification requirements. In this regard, GAO has consistently held that the fact that potential offerors may be precluded from offering their products does not render a specification unduly restrictive of competition, if, in fact as here, it represents the legitimate needs of the Government. See Gardner Machinery Corporation; G. A. Braun, Inc., B-185418, 15 September 1976, 76-2 CPD 245; Johnson Controls, Inc., B-184416, 2 January 1976, 76-1 CPD 4. Further, GAO has stated that it will not substitute its judgment for that of the procuring agency, even where competition is restricted, unless the protester presents clear and convincing evidence that a contract awarded on the basis of such a specification would, by unduly restricting competition, be a violation of law. See Gardner, id., and Johnson Controls, id. We would underscore that although the instant protest has been pending since 1 July 1980; Julie has yet to present such proof.

7. Since competition was obtained for this procurement; Julie did not submit a bid, and Julie's automated components would obviously be in excess of the Government's reasonably defined and legitimate needs; Julie's challenge to the time allowed for bid preparation is deemed specious and without merit.

8. MICOM's administrative report documents that 511 of the 607 components in the sets to be procured are required source items. Of those 511 required source items, a little less that half, constituting a little more than 50% of the cost involved, must be procured from large business. The remainder represent small business items. Further, the successful small business prime contractor is at liberty to manufacture 96 additional "suggested" source items himself and is required to perform a significant amount of work in addition to assembling the component that make up the end items, as detailed in paragraph 5 of the inclosed request. Based on these facts, Julie's position before GAO that this procurement should not have been set aside for exclusive small business participation because of the large business subcontracting involved is deemed without merit. In this respect, the legal opinion contained in the inclosed administrative report correctly cites recent GAO precedent indicating GAO will uphold this set aside, notwithstanding the fact that a significant portion of the work will be subcontracted to large business because the facts establish the small business prime contractor will be making a "significant contribution" to manufacture or production of the end items. See Fire & Technical Equipment Corporation, B-191766, 6 June 1979, 78-1 CPD 415 and Jazco Corporation, B-193993, 12 June 1979, 79-1 CPD 411, cited therein.

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DRCGC-P 15 AUG 1980
SUBJECT: Request for Approval to Make Award Under Solicitation DAAH01-80-B-0332 Prior to Resolution of GAO Protest B-199416 by Julie Research Laboratories, Inc.

9. The Contracting Officer's D&F documents: The equipment being procured is urgently required because deployment of these sets has already been scheduled. The 95th Service Company, an active Army TOE Unit, is scheduled for deployment to the division level beginning in March 1981. The first ten (10) sets are commited to partially fulfill that obligation, and it is considered critical that the first three sets be delivered in May 1981 to meet commitments and requirements at Fort Hood and Fort Riley. Acceleration of the delivery schedule will be necessary to meet the existing schedules.

10. Based on the foregoing, this headquarters supports MICOM's request to make award under Solicitation DAAH01-80-B-0332 prior to resolution of the Julie protest, subject to advice from the procuring activity that the low responsive, responsible bidder entitled to award has been properly identified. Accordingly, we recommend that such authority be granted in accordance with the terms of DAR 2-407.8(b)(2) and (3) and ADARDS 2-407.8(i) when the identity of the eligible awardee is communicated to your Office.

FOR THE COMMANDER:

B. M. Klein

Incl
as

for F. X. McKENNA
Command Counsel

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35898

AUG 1 1980

DRSMI-IZC-M

SUBJECT: Approval of Award under DAR 2-407.8(b)(3)(i)

Commander
US Army Missile Materiel Development & Readiness Command
ATTN: DRCGC
5001 Eisenhower Avenue
Alexandria, VA 22333

1. Invitation for Bid (IFB) DAAH01-80-B-0332 was issued by this command on 8 May 1980, pursuant to 10 USC 2304(a)(1) and DAR 3-201.2(b)(ii), as a Small Business Set-Aside multi-year procurement, with options. The basic requirement covers 18 each Calibration Sets, Secondary Transfer, and 18 each Calibration Consoles, with an option requirement of 1-4 each on the transfer sets and 1-4 each on the consoles. The FY 81 requirement covers 30 each transfer sets, 32 each consoles, and 15 each Augmented Standards Set Kits, with option requirements for 1-6 each transfer sets, and 1-4 each on the consoles. The FY 82 requirement covers 39 each transfer sets and 17 each consoles, with option requirements for 1-3 each transfer sets. In addition, there is a requirement for 1 First Article, manuals, and Data and Reports.

2. Prior to the date for submission of bids, which was extended from 18 June 1980 to 28 July 1980, a protest was submitted to the General Accounting Office as follows:

a. On 30 June 1980, Julie Research Laboratories, Inc, 211 West 61st Street, New York, NY 10023, protested on the basis that the equipment to be supplied under referenced solicitation is effectively restricted, both by the form of the solicitation specifications and by the time restrictions established for preparation of a responsive bid by offerors, thereby barring Julie Research Laboratories, Inc from consideration as a subcontractor by prospective offerors.

b. In a supplement to the original protest, contractor requested an investigation on the basis that this is a Small Business Set-Aside and the specifications call for the furnishing of contract "end items" manufactured by large business concerns.

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DRSMI-IZC-M
SUBJECT: Approval of Award under DAR 2-407.8(b)(3)(i)

3. Since the current contract covering the previous buy of this equipment was awarded to a small business and there were several other bids received from small businesses, the PCO determined that there was a reasonable expectation that bids would be received from a sufficient number of responsible small business concerns so that award would be made at a reasonable price, and therefore, set it aside for small business concerns.

4. In addition to the above determination, the requiring element, the US Metrology and Calibration Center, considers it absolutely essential that the current requirement be identical to the previous buy in order to maintain the integrity of the set, since physical space in the racks is at a premium. Anything larger than the instrument currently in use would necessitate a major reconfiguration of the set. In addition, provisioning parts have already been purchased, as well as new equipment training; and these items have already been fielded and technical bulletins published and furnished to men in the field. If other instruments were to be substituted, it would necessitate requalification of the items, additional spare parts provisioning, new equipment training, and the publication of new technical bulletins and supply catalogs. This would increase the cost to the government and cause an impact in getting the equipment to the field in a timely manner. There is presently an urgent need to get it fielded as soon as possible and it is anticipated that the successful offeror will be requested to accelerate delivery. It is considered critical that the first three sets be delivered in May 1981 in order to meet commitments and requirements at Fort Hood and Fort Riley.

5. It should be noted that although a number of components must be obtained from large business concerns, there are approximately 96 items that the contractor can manufacture himself or buy from someone else.

6. There is a significant amount of work for the successful bidder to accomplish, in addition to assembling the components that make up the end items, as follows:

a. Fabricate or sub-contract special workbench cabinet tops, including mounting/anchor brackets and extender.

b. Procure the components of and assemble the rack and workbench consoles.

c. Fabricate and install the electrical power disbribution system in the racks.

d. Fabricate and install the storage drawer cushions; make drawings of the equipment layout therein.

e. Procure and install chassis slides into the equipment racks and on the equipment.

f. Perform burn-in tests on the active components for reliability purposes.

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DRSMI-IZC-M
SUBJECT: Approval of Award under DAR 2-407.8(b)(3)(i)

g. Package the equipment into kits/sets for delivery to destination.

h. Fabricate special torque plate mounting fixtures.

i. Fabricate or sub-contract for special storage dollies. (5 each)

j. Provide drawer content decals.

k. Fabricate high pressure gas bottle storage fixture.

l. Procure the standards and accessories identified in the IFB tables.

7. Prior to solicitation, consideration was given to the fact that some of these components were to be procured from large businesses, but it was determined that this procurement was an appropriate Small Business Set-Aside because of the significant contribution the successful bidder would ultimately make to the manufacture of the end item. The contracting officer arrived at this decision after talking to the appropriate technical and legal personnel.

8. Based upon the above facts, it is this command's opinion that the protest is without merit and that the GAO will ultimately deny the protest. The Comptroller General has consistently upheld Small Business Set-Asides where a portion of the supplies was manufactured by large businesses, with the small business making a significant contribution to the manufacture of the end item. This set of facts exists in the instant protest.

9. It is imperative that contract award be made on the instant competitive procurement in a timely manner in order to avoid a delay in getting the urgently needed equipment to the field.

10. In view of the above, request approval for award prior to resolution of the protest, under provisions of DAR 2-407.8(b)(3)(i).

11. The Contracting Officer's Determination and Findings has been made pursuant to DAR 2-407.8(b)(3)(i), Inclosure 1.

FOR THE COMMANDER:

J. A. MULLER
Director
Proc & Prod Dir

Telephone coordination w/DRSMI-M
7/29 E. Fordice

1 Incl
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SYMBOL	DATE	NAME
IZC-M	[illegible]	
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CONTRACTING OFFICER'S DETERMINATION AND FINDINGS
Relative to Urgency of Award on IFB DAAH01-80-B-0332

Upon the basis of the following determination and findings, which I hereby make as Contracting Officer, it is determined that award is urgent on IFB DAAH01-80-B-0332.

FINDINGS

1. IFB DAAH01-80-B-0332 was issued on 6 May 1980 for Secondary Transfer Calibration Sets and related equipment.

2. Nine (9) amendments were issued and the date for receipt of bids was extended three times to a final date of 28 July 1980.

3. Deployment of these sets has already been scheduled. The 95th Service Company, an active Army TOE Unit, is scheduled for deployment to the division level beginning in March 1981. The first ten (10) sets are committed to partially fulfill that obligation. It is considered critical that the first three (3) sets be delivered in May 1981 to meet commitments and requirements at Fort Hood and Fort Riley. Acceleration of the delivery schedule will be necessary to meet the existing schedules because of delays previously encountered.

DETERMINATION

Based on the findings set forth above, I hereby determine, in accordance with DAR 2-407.8(b)(3)(i), that the equipment to be provided is urgently required. Award must be made notwithstanding the unresolved protest from Julie Research Laboratories, Incorporated.

1980 JUL 30
DATE

CONTRACTING OFFICER

INCLOSURE 1

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TELEPHONE OR VERBAL CONVERSATION RECORD

For use of this form, see AR 340-15; the proponent agency is The Adjutant General's Office.

DATE
8-29-80

SUBJECT OF CONVERSATION
REQUEST TO AWARD NWS PROTEST B199416 by JULIE RESEARCH LABORATORIES, INC.

INCOMING CALL

PERSON CALLING Bob Sisle	ADDRESS MICOM P&P	PHONE NUMBER AND EXTENSION
PERSON CALLED Mrs. Tharp	OFFICE DRCGC-P	PHONE NUMBER AND EXTENSION

OUTGOING CALL

PERSON CALLING	OFFICE	PHONE NUMBER AND EXTENSION
PERSON CALLED	ADDRESS	PHONE NUMBER AND EXTENSION

SUMMARY OF CONVERSATION

Per Mr Sisle: MICOM received favorable preaward survey of RIDGE INSTRUMENT .Therefore, that firm has been determined the lowest responsive, responsible bidder and MICOM want to award to them.

Phoned Jim Ranew to passs along above info in connection w/subject request to award.

DA FORM 1 APR 66 751 REPLACES EDITION OF 1 FEB 58 WHICH WILL BE USED.

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file
Julie Research

ATTN: Ms. Tharp
Phone 274-8176

IMPACT STATEMENT IF PROCUREMENT IS DELAYED

This program is for the procurement of Calibration Standards Sets: Secondary Transfer. These sets, AN/GSM-286 and AN/GSM-287, provide the capability of calibrating and repairing electronic, physical, mechanical, RF, microwave, and infrared test, measuring and diagnostic equipment as designated by Army regulations, technical manuals, and bulletins. The overall requirement for the program and equipment is to assure that Army prime weapons and communications systems are provided with test equipment that is both accurate and serviceable. As such, the program directly affects the readiness and mission effectiveness of both tactical and strategic Army units. Specifically, the 95th Service Company (Calibration) (TASCOM) would not receive three of its required sets that are needed to perform its mission to support eleven US Army divisions. In the event a division becomes mobilized for rapid deployment purposes, it would not have as part of its equipment inventory calibration and maintenance capability for the support of general purpose test measurement and diagnostic equipment (TMDE).

JAMES R. CISSELL
AV 746-4201

Copy sent by Special Messenger
to SARDA 8/21/80

KCT

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Senator PRYOR. Who are we purchasing calibrators from at this time? Who is the U.S. Army purchasing calibrators from at this moment?

General SOLOMON. Calibrators is a fairly large subject, I believe, but the ones that are at specific issue here are being purchased or have been recently purchased, I believe, from a firm such as Hewlett-Packard and Fluke, as Mr. Julie has said.

Senator PRYOR. The companies that operate in this field are becoming fewer and fewer, is that correct?

Mr. AMBROSE. In these particular instruments, I think that is probably correct.

Senator PRYOR. The Army is good at that. We have one tank contractor, Chrysler. We are ultimately going to have one calibrator contractor and that is going to be someone, evidently not Mr. Julie. You all have pretty well run him out of business. What is going to be next? Are we going to wind up in 5 or 10 years with all the big fish swallowing up the little fish and finally two or three contractors doing all the work for the Pentagon? Is that what we are leading to?

Mr. AMBROSE. Senator Pryor, I don't know if you were in the room when I said that the Army does almost $4 billion worth of business a year with small business firms. That is 25 percent or more of the total Army purchases. I don't believe that is an indication that we are going to buy from only big firms.

Senator PRYOR. Well, another scary figure, if you want to throw figures around, is that about 70 percent of all the procurement by the Pentagon is done sole source without competition, no competitive bid, which is adding to this whole situation of bigness taking over small industry, taking over those entrepreneurs, taking over those people who are creative who have really made this country what it is today.

And I think in the final outcome we are seeing this really have an effect on the pocketbooks of the taxpayers in overruns and inefficiencies and waste, and in some cases fraud.

I think the area of sole source contracting is one that is leading us to a catastrophic result, and I only hope that you would consider that as both of you begin your careers with the U.S. Army.

How independent are you, General Solomon?

General SOLOMON. Senator, with 9 weeks' experience behind me in the Department of the Army, Inspector General Office, I am convinced of the independence of this investigation and those I have had an opportunity to review. I might also add, sir, the Inspector General of the Army is present and he has been at it longer than anyone else in the history of the United States, about 44 years.

Senator PRYOR. Is it your feeling we should or should not have what we call an independent Inspector General, independent of the Secretary of Defense, independent of or from the Secretary of the Army? What is your feeling there?

General SOLOMON. You are asking for my opinion, sir, and we are talking about fraud and waste here. I think it would be a waste of the taxpayers' money because I am convinced of the Army's ability to conduct an investigatory agency.

Senator **Pryor**. Who named you to this position? I am not disputing your character, I am trying to get to an amendment I am going to offer to the Defense bill which creates an independent Office of Inspector General

General **Solomon**. I was assigned by the Chief of Staff of the U.S. Army to this position.

He approved my assignment.

Mr. **Ambrose**. Senator Pryor, I wonder if I might comment on this? I am not up to date, or thoroughly caught up with the question of independent inspectors General but speaking for myself, and I believe Mr. Marsh, we put an awful lot of value on having these people at our disposal to go do the sort of things I think they have done very well here. I think the thrust of your questions is not to suggest that this resource would not be available to us. Perhaps it would be in order also to take a moment and ask Lieutenant General Trefry for any comment, if that would be your pleasure on this subject?

Senator **Pryor**. I don't want to supersede the chairman's wishes on this. If he wants to state something in this area, I would not object. Maybe we can have it done for the record.

Chairman **Roth**. If it is satisfactory, I would like it to be done in writing because we still have three other Army witnesses.

Senator **Pryor**. I would like to conclude, not with a question, but with a statement about this entire situation. I led off with a question about how many Mr. Julies there are out there in America. I am afraid there are an awful lot of them who have been discouraged and had to drop out because of financing, of not being able to compete in a marketplace that is being reserved for very few people—and fewer and fewer people. I also say that those individuals in the Army, or in the Navy, or in the Marines, or in the Defense Department, or in HUD, wherever those individuals who allow a procurement debacle to happen like this one has happened, I think very honestly strike a blow to our national defense posture because it saps morale, it discourages competition, it destroys the esprit de corps and more than anything else, I think, it makes the Congress overreact sometimes to appropriation bills. We will say that we have to stop this so we will cut out this program, or we will do this, or we will do that.

It is so important and so critical that every procurement official, and I know that there are thousands out there in the Department of Defense buying toothbrushes and vitamin pills for the PX's and M-1 tanks for the Army, whatever, every one of those individuals up and down the line ought to know the enormity and the impact of their every move toward opening up competition and increasing morale because we are sapping the strength out of our entire economic system and our military system. I think procurement is one of those areas that is making people, like some of my colleagues I won't name, ask questions about defense, that they would never have asked some years back. It is happening and I think it is happening because of procurement decisions on how to purchase weapons and the use of the buddy system on who we buy them from, and it is dangerous, and I just hope that each one of those individuals will know how vital their role is in the defense posture of this country. It may be too late to save Mr. Julie, but maybe there are some more out here we can save.

Mr. **Ambrose**. Senator, let me assure you I am sensitive to the points you make about are there any more. If there are, we will do everything we can to find them, straighten it out.

Chairman **Roth**. Senator Rudman?

Senator **Rudman**. Thank you, Mr. Chairman.

General Solomon, I want to refer to page 9 of your report. Having had over the years some experience in writing reports of this nature in a different field, I want to just discuss an element of it with you.

Key issue No. 3, have some elements of the Army misled JRL, the General Accounting Office, the Congress, and other parts of the Army concerning Julie Research Laboratories on calibration issues? JRL's contention that there has been a deliberately malicious campaign against JRL interests by the Army was not substantiated but it appears through the IG inquiry that various Army officials on various occasions have perpetuated, at least unwittingly, certain misconceptions concerning JRL equipment by the permitted wording on official documents going forward, that is, to higher headquarters and thus eventually to the GAO, Members and staffs of the Congress, which contains statements which are inaccurate, unproven, inconsistent and/or otherwise open to various interpretations.

I am sure that a great deal of thought went into the writing of that paragraph.

That is one of the most important paragraphs of the report and I understand in writing such a report that the IG, keeping in mind due process and other factors, is very concerned about making totally unsupported allocations. Let me ask you this: When you reviewed the evidence that you have before you and sat down to write this report, was there any evidence at all, even though it might not have amounted to enough evidence to reflect in the report, that there had, in fact, been generated, by the strong personal feelings that have come to exist between the parties in this, a certain element of deliberateness in terms of obstructing Mr. Julie's opportunities to do business with the Army, and I am talking with respect to lower echelons?

General **Solomon**. Senator, I have had an opportunity to review approximately 17 inches of written transcript. There are other hours of tapes that I have not completed yet, but will within the next few days. I would not want to testify to you that I believe there was a deliberate attempt, a cabal, if you will, to deny Mr. Loebe Julie an opportunity to compete, but there were definitely inconsistencies and this is what we have stated.

Senator **Rudman**. When you say "not a cabal," in other words, there wasn't a conspiracy; but did you find evidence of maybe more than just errors and admissions on the part of lower level people that brought you to question seriously what their motivations might have been?

General **Solomon**. Yes, you are asking for my opinion?

Senator **Rudman**. Yes.

General **Solomon**. In my opinion, yes, I believe that I read some testimony which I would want to question further.

Senator **Rudman**. Thank you very much because I assume that would be your answer because looking at this, I could almost write the draft that was written before this draft and I don't say that critically. I think that you have to be very careful in reports of this type. They represent the opinion of the highest level of authority in terms of independent investigations of the Army and they have to be responsible and have due regard for people's rights; I share that. But Mr. Ambrose is a different problem and to you, Mr. Ambrose, I just want to say, I expect you have a great deal of work to do in terms of examining lower levels of procurement in this case and others to see whether or not the inferences, at least, contained in this paragraph of this report need action, be it punitive, administrative or otherwise; I would like your response to that.

Mr. **Ambrose**. Well, I think you were out of the room when I spoke to Senator Pryor in this same vein. I am very sensitive to the potential that there is more than this and intend to find out about it and do something about it.

Senator **Rudman**. Finally, just before I had to leave to vote, we were discussing ways of confronting this. I have this whole problem about how we might resolve it, how the Army might resolve it. I noticed in your material that you furnished us with a sheet from Julie Research showing that the so-called low cost 106 was in fact a number of different items depending on how they were configured. Do you think that it is possible as one of the options you have facing you that you could, in coordination with the Army, field a command that has I believe, the U.S. Army Materiel Development and Readiness Command, and work with them to do your own in-house practical field test of some of this equipment which would have the dual purpose of, one, maybe remedying an injustice done to this small company and, two, maybe allowing the Army to find out the equipment will do everything Mr. Julie says it will do; that it certainly would increase the number of pieces of equipment in the field that you can do calibration on. Is that an option you will seriously consider?

Mr. **Ambrose**. The answer is yes, we will seriously consider it. I remind you one attempt that didn't seem to work out as well as I guess it should have was made by purchasing a Julie apparatus, in fact, two of them, putting them in White Sands and comparing them against manual methods with the objective being to see what there was to his claims of superiority over the manual stuff. And out of that he got a fairly good report card.

It is my view, first we ought to make very sure we have a fair objective test. That one has led to more contention than it has settlement of these questions. So before doing anything in this, I want to see to it that we have a fair set of specifications or measures and an evaluation process and people that I can count on to give me an objective and partial representation.

On the other hand, I would like also to make this a test of something that would wind up going on into future use so that we could get more than just that one test benefit of it. That involves a lot of other considerations which I have tried to put in front of you, and I can't tell you at this moment whether the best thing to do is to conclude—to just put a test together of apples-to-apples instruments and see how they turn out one against the other, or to put a test together that has that objective and putting it into service once we get through with it, but I will get to it as quickly as I can.

Senator **Rudman**. Mr. Ambrose, let me simply say I have looked at your background, what you have done. You are technically well grounded. You have held many responsible positions; no one has any reason to believe you want to be anything but fair and correct in discharging your responsibilities. But let me simply say, I think there has been a lot of institutional—I am not sure what the right word would be, but let me use a polite word, institutional impoliteness on both sides of this issue and I think Mr. Julie can be faulted for some of his methods of doing things. On the other hand, I think that might have been grounded in abolutely the ultimate in frustration. Be that as it may, you are a new person in this position. I hope at least Mr. Julie will feel from now on that he is getting a fair hearing by the Army.

I think that is all he ever really asked for.

Mr. **Ambrose**. If I have anything to do with it, he will. Somebody said I came over here unarmed. I don't remember who it was, I am grateful for the defense. I spent a lifetime dealing with bureaucracies of one kind or another. I don't feel that uncomfortable about getting an institutional thing changed, if I last long enough.

Senator **Rudman**. Thank you very much, Mr. Ambrose.

Mr. **Ambrose**. Mr. Chairman, there is one record point that I would like to make and I should have made it earlier because I don't want it really to be an adverse note of some kind, although I guess it has that effect. It was an earlier question, I think, asked of Mr. Julie as to whether he had in his employ military personnel, military officers, if I remember it correctly. I think the answer was no. I think it should be stated for the record that Mr. Julie had over some period of time, and I believe not now, a military warrant officer, and that he relied specifically on this individual for insight and evaluation of the European situation and of the feasibility and utility of his equipment.

It seems to me that in fairness, when an individual uses, as he has so many times, a statement that the Army has been less than candid, it ought to be put in the record that he had such an individual and he has called him out, I believe, in some of his documents.

Chairman **Roth**. Thank you, Mr. Secretary.

As Senator Eagleton pointed out, this is a fairly common practice.

Mr. **Ambrose**. Yes, the differentiation I got from it, or the thrust from it are that big companies did this and little companies didn't, or couldn't, and I think the facts are otherwise in this particular instance.

Chairman **Roth**. Mr. Secretary, if there are no more questions——

Senator **Levin**. I do have questions.

Mr. Chairman, this whole sickening business proves a number of things, but I would like to concentrate on just two of them. One is the abuses of sole-source contracting and the other one is the toothlessness of the appeal process that we have when a contract is awarded.

First, on the sole-source contracting, I had offered an amendment on the DOD authorization bill this year to reduce the amount of sole-source contracting. The amendment simply would have required, in effect, that there be a greater opportunity for persons to file competitive bids. We would have increased the number of days that that was possible from 10 to 30 for contracts over $100,000, subject to certain exceptions.

DOD fought this like hell. I mean it really fought me on it. I lost by one vote in conference because of DOD opposition.

We are going to keep fighting that battle. The House has agreed to take up the bill and hold hearings on it promptly. But I would hope that based on this experience, Mr. Secretary, that you might use your good office in DOD, based on the short experience you have had with some of the abuses of sole-source contracting, to see if you cannot help reduce the amount of sole-source contracting which the Pentagon is willing to support.

Second, as relates to the appeal process where there is an award which a potential competitor wants to appeal, we have a process that permits such an appeal to the GAO. It is toothless because the contracting officer can simply go ahead with an award anyway. In effect, he simply says it makes sense for the Government to proceed with an award while an appeal is pending, and they do it all the time.

In two of these contracts, which I want to refer to in a minute, an award was made while an appeal was pending. You have indicated, I think, to Senator Pryor's questions that you are going to forward the justification that was provided for not waiting to even hear from the GAO on the bid protest that was filed and, I understand, timely filed in both instances.

I am wondering if you could tell us who is the contracting officer on the June 1980 award to Ridge?

Apparently on the September 1981 contract, you mention that Mr. Robert Hawkins was the contracting officer. Was he also the contracting officer, do you know, on the June 1980 one?

Mr. **Ambrose**. Let me see if we have it here. If not, we will get it for the record.

General **Solomon**. I will look for it, sir.

Mr. **Ambrose**. We will get it to you, Senator, for the record at least.

Senator **Levin**. If the General doesn't have it, we will welcome it for the record.

[The information referred to follows:]

Robert E. Hawkins is the contracting officer on Contract No. DAAH01-80-C-1643.

Senator **Levin**. I am proposing an amendment which will subtantially tighten up the requirement to make it harder to ignore an appeal, harder to go ahead and award a contract where there is a timely appeal which is pending.

I am wondering, do you have enough experience, based on the short time you have been at DOD, to indicate whether or not you might be supportive of tightening up that process so we don't see a contracting officer just ignoring timely appeals and going ahead and awarding contracts anyway?

Mr. **Ambrose**. Senator, I must say, this was a rather surprising discussion, yours and some earlier discussion on this point, to me because I have been on the other side of the fence and I did not perceive that, as you call it, the GAO is toothless.

Senator **Levin**. The procedure is toothless.

Mr. **Ambrose**. Excuse me, I have considered and we have in prior years been in protest on both sides of the fence, had always considered the GAO as a fairly good operation and fair——

Senator **Levin**. I wasn't criticizing GAO. I am saying when their fair, thorough, objective report comes in a month later, it is too late to do anything because the contracting officer went ahead and awarded the contract anyway.

Mr. **Ambrose**. I meant to refer to the totality of the process, not just the eventual decision. But having heard all of this, I intend to go back and find out more about this because from my point of view, although I hope that we will have a well-ordered house with no problems that wander over to the GAO, I would like to feel very confident that I can count on a GAO equitable, sensible process, if not the court of last resort, at least the next step in the process.

So I assure you that I will go look into it further. I simply was not aware there was this kind of a problem, perceived or actual.

Senator **Levin**. There is an actual problem, as well as perceived. More important, an actual problem. I will send to you a letter which was sent October 22 by myself to Mr. Seymour Efros, who is Senior Counsel to GAO. We welcome your comments.

Mr. **Ambrose**. I will be glad to.

Senator **Levin**. I don't know if the General has had an opportunity——

General **Solomon**. I believe I have it here, but I do not have the name yet.

Mr. **Ambrose**. I suggest we do it for the record.

Senator **Levin**. All right.

The last point I would want to make, I suggest that you go back and look at the test results on the calibration systems you referred to. You said you are comparing apples and oranges. According to our information, which may be inaccurate, the Fluke system and the Hewlett-Packard system are automated, not manual systems so that that means you are comparing automated with automated, not automated with manual. Three of the four systems were automated systems.

I see a lot of heads shaking back there, I won't take a vote of the audience, but I would appreciate your looking back into that because I think your apples or oranges comment is not accurate.

Mr. **Ambrose**. The apples and oranges I believe I was referring to, in any further test I would want to make sure the equipments were supposedly equivalent in performance, otherwise it would be apples and oranges.

In the past, there have been various acquisitions and tests of, I believe, automated equipments from all three that have been mentioned, Hewlett-Packard and Fluke and JRL, but they have not been set against one another in an equivalent setting and under common ground rules. There has been deduction use.

Senator **Levin**. You acknowledge those three were automated but under different circumstances?

Mr. **Ambrose**. Yes, of course, all three make manual equipment and that has been used one way or the other in various configurations.

On your earlier question of sole source, I make one comment, to me that is a large important subject. I don't feel that I am proficient enough at this point to respond exactly to you, but I assure you that getting effective competition, and I would like to underline effective because competition just to have two or three people marching is not necessarily a way to get effective, which means best cost to the Government. Getting that is a big serious problem. It is at the root of a lot of the problems we are presently faced with, I believe. But it is a very large subject and I am sure even in an informal way, we could spend hours discussing it, but I assure you I will get into it as heavily as I can and talk to you another time about it.

Senator **Levin**. Thank you.

Senator **Pryor**. Mr. Chairman, may I make one statement for the record, just an apology, if I need to make one, to you, General Solomon. I in no way intended to question your integrity, or your independence. I was talking in a generic sense about the concept of independent Inspector Generals. You just happen to be the target at the present. You are the one on whom to vent our frustration. In no way do I question your integrity. The report is fine. I am glad you got here, or maybe we never would have had this thing come to the head it has.

Thank you and I want to apologize to you specifically.

Chairman **Roth**. Thank you, Mr. Secretary.

We appreciate your being here and we will be in contact at a later time. It is the intent of the Chair to continue these hearings.

[Mr. Ambrose's prepared statement, responses to written questions submitted by Senators Roth, D'Amato, and Representative Weiss, responses to written questions submitted by Senator Roth to General Solomon, and a report submitted by General Solomon follows:]

PREPARED STATEMENT OF JAMES R. AMBROSE

James R. Ambrose was nominated by President Reagan to be Under Secretary of the Army on September 30, 1981, was confirmed by the United States Senate on October 7, 1981, and took the oath of office on October 13, 1981. As one of the Army's top civilians, he will assist in formulating overall Army policy, procedures and programs.

Mr. Ambrose was born in Brewer, Maine, on August 16, 1922. He was educated through high school in Bangor, and graduated with high distinction and departmental honors from the University of Maine in 1943 with a degree in engineering physics. Later he attended Georgetown University, Catholic University, and the University of Maryland where he acquired a substantial part of his post graduate education in physics and mathematics.

Mr. Ambrose was employed during World War II and until 1955 at the Naval Research Laboratory (NRL), in Washington, D.C., where he was involved in the early development of ship and airborne radar systems, semiconductors, nuclear weapons, and nuclear reactors.

In 1955 Mr. Ambrose joined the newly formed Lockheed Corporation, Missile Systems Division, and later that year became one of the principals in another new firm, Systems Research Corporation, which eventually evolved into the Ford Aerospace and Communications Corporation. He spent over 36 years in these organizations in technical management assignments, primarily related to defense equipment and systems, space programs, and major communication, command, and control systems. Major projects he has been involved in includes the Shillelagh anti-tank weapon, Sidewinder/Chaparral air defense system, NASA Mission Control Center (Houston), Ford/Philco support services in Vietnam and at NORAD, and US, NATO, and Intelsat communications satellites. For the last 13 years prior to his retirement, he was Vice President for Technical Affairs for Ford Aerospace Communications Corporation and served as the principal corporate trouble-shooter on major contract performance problems.

Mr. Ambrose is currently a member of the American Physical Society, and until his retirement in 1979, was a senior member of the Institute of Electrical and Electronics Engineers. In 1975, he was Chairman, Technical Management Policy Group, Aerospace Industries Association of America, Inc., which is responsible for coordinating industry/defense standardization efforts. He has been a member of numerous technical and defense oriented groups and is currently a Director and Treasurer of Hospice of Polk County, North Carolina.

Mr. Ambrose is a widower, and has four sons.

I am James R. Ambrose, Under Secretary of the Army. Although I have officially been in office since October 13, I have been serving the Secretary of the Army in a consulting capacity for about three months.

My biography has been made available to the Committee. It may be pertinent to note that in my former positions I have both been a developer and user of test equipment and had oversight responsibilities for test equipment calibration and maintenance organizations and capital investments. So I am familiar in a general way with the subject matter of this hearing.

In late August, the Secretary asked me to oversee The Inspector General's investigation which he had commissioned in April, just two months or so, after he assuned office. I will highlight certain aspects of that investigation which have a particularly important bearing on the position of the Army in this matter and which I feel will be of particular concern to the Committee in its deliberations.

I am appearing here at the request of the Committee to address issues and allegations made by Julie Research Laboratories (JRL).

First, a word about the Army's methodology regarding its conduct of its independent investigation into the allegations of Mr. Julie, of Julie Research Laboratories (JRL).

Disputes between JRL and the Army over various matters have existed since 1968. Since 1968, JRL has received two contracts, failed to win other competitive contracts, and been excluded from, or ignored as a potential source, in still other procurements.

JRL has made allegations which have extended far beyond those normal to a disappointed bidder and has brought into question the entire Army Metrology System and its performance with respect to calibration quality. Other allegations assert large dollar savings which are not being gained and sundry imperfections in the Army procurement process. In other words, the JRL allegations have gone to the heart of the Army's calibration procurement methodology and theory.

Because of the serious implications of these allegations, the Secretary of the Army commissioned the Office of The Inspector General (DAIG) to conduct a complete review of the allegations, including taking testimony under oath. The intent was, and is, to get to the bottom of the charges, to disclose whatever systemic weaknesses and deficiencies might exist, and to take whatever actions might be necessary to remedy the situation. The instruction to the DAIG was to hide nothing and to let the chips fall where they may. This instruction has been carried out.

The ensuing investigation has been time-consuming because the number of distinct allegations is large, the trail led to a number of Army organizational elements in the

US and Europe, and a considerable number of people have been interviewed.

The DAIG investigation has been completed as of the end of October, a draft report exists and a final report will be issued on November 16, 1981, addressing both the systemic allegations as well as the more recent protest of JRL regarding a specific procurement in September 1981.

The final investigative report along with my recommendations -- most of which will be enumerated here -- will be transmitted to the Secretary for his final action. Certain corrective actions have been ordered or accomplished upon my authority based upon my recently concluded review of the draft DAIG report.

Although some 58 separate allegations have been made which will be individually addressed in the DAIG final report, the essence of these has been consolidated as follows:

Issue 1. Is the Army seriously deficient in the quality of its calibraiton work, and, if so, does this affect the performance of weapon systems and other operational equipment?

Response. There is no basis for asserting significant degradation of calibration quality or consequential reduction in operational suitability of Army equipment.

The Army, and the other military services, utilize a set of statistical criteria, calibration cycle times, and qualitative procedures for revising cycle times for test equipment. These criteria represent a balance among probable effect on operational performance of instrumental inaccuracies, test instrument stability, actual diagnostic utilization of the test equipment, and cost to perform calibration services. [Refer to Figure 1.]

Pursuant to the procedures established to maintain equipment within acceptable tolerance levels, the average for all instruments will show that at any instant at least 90% will be within tolerance. Very few will be significantly beyond the tolerance limit. As a consequence, there is no basis for asserting major shortcomings in Army performance due to calibration equipment.

Issue 2. Could large sums of money be saved by widespread adoption of JRL automated equipment and, in particular, by displacement of manual calibration equipment and, further in particular, by utilizing JRL equipment instead of other competitive automated equipment?

Response

The overall answer to this issue is that undoubtedly some additional money in some locations could be saved by further automation. But the amounts are much less than claimed by JRL, and probably more than asserted in prior Army and Air Force studies and responses. And it is far from clear that the JRL equipments, which have not been the low bids in most competitive procurements, would yield the best cost trade-off among competitive automated calibration equipment.

Automation is practically applicable only to a part of the total inventory of test equipment and to a still smaller part of the total in the region of parameters addressed by JRL equipment. It is not feasible to displace all manual calibration equipment with JRL or any automated calibration system. There are simply too many varieties of performance capabilities, measurement parameters, configurations and technologies. Some test equipments still in service go back to World War II vintage, some use vacuum tubes, some measure quite unusal parameters, each ill-suited to automated calibration systems.

Nevertheless, further automation can and will be employed to effect legitimate cost savings. We recognize this fact. We also recognize that it will be necessary for the Army to establish adequate data bases and economic analyses in order to arrive at satisfactory decisions requirements and procurement specifications for such equipment.

Issue 3. Has JRL been accorded an adequate and proper treatment with respect to the many procurement actions, protest proceedings and other Army contracts in which it has been involved?

Response. The short answer is: probably not. But the short answer requires some elaboration because this is not a one-sided matter.

First, there is no evidence that the Army can find or that JRL has submitted that supports the allegation of kick-back.

Second, some Army procurement actions represent marginal interpretations of the regulations which in sum do not accord with the spirit of the procurement policies.

Third, the methodology, dogmatic viewpoints, and selective representations by JRL have not contributed to reasonable consideration of JRL offerings and protests.

Finally, there has been failure on both sides, by JRL and the involved Army offices, to be adequately specific in setting forth the equipment and performance offered, the terms of the offers, the basis for evaluation, and the methodology of economic analysis. Neither side has been adequately forthcoming in seeking to understand, clarify or resolve matters of fact. Each side has utilized or resorted to obtuse lines of reasoning to excuse such failures.

The DAIG will substantiate 28 of the JRL allegations, at least in part. 24 were considered to be unsubstantiated. It is not possible to accord a weighting of importance to one allegation versus another. Hence, such a summary primarily means that the DAIG considers that in many instances JRL was correct in its allegations, but not in all.

Issue 4. Does the calibration of test equipment and the backlog of work in the U.S. Army in Europe seriously impair the operational readiness of the Army particularly with respect to its European theater duties? And, if true, can the problem be alleviated by acquisition of JRL calibration equipment?

Response. Until recently the European Theater, U.S. Army had a serious problem of maintenance backlog in test equipment. The backlog problem arose out of past neglect and deferral of test equipment maintenance and scattered organizational responsibility.

In November, 1979, a reorganization in European-based calibration repair methodology flushed out some 13,000 pieces of test equipment that had previously been neglected or ignored. This sudden and unexpected calibration and maintenance burden combined with an underestimation of workload and inadequacy of preparation to yield a very large backlog. The most significant impediments to addressing expeditiously the backlog were lack of repair parts, missing maintenance documentation, and relatively long repair times for unfamiliar test equipment.

The previous serious backlog has since been reduced but is still high. Though calibration turn-around time was not a significant issue in either the establishment or reduction of the backlog, some improvement in calibration time has been attained on routine items such as meters by installing automated meter testers at certain sites. But the basic work flow is mainly determined by repair times and could modestly be affected by further automation of this kind. Estimation of precise economic gain to be realized from automation requires a site-by-site analysis since workload varies considerably from site to another. This analysis will be done, but in the context of examining need and desirability of retaining many of the obsolete pieces of equipment.

The impact of this past neglect and turmoil on operational readiness cannot be readily ascertained. No doubt there was some effect, but it has not been possible to quantify it.

No serious instances of impaired operational readiness were found by the DAIG team on its recent European theater review related to calibration delay.

It appears that the entire concept of mobile station calibration maintenance needs to be reexamined since it is not at all evident that adequate service, especially spare parts stocking and repairing, can be accommodated within the existing mobile stations used in field locations.

Issue 5. Is the JRL Locost 106 suitable and/or uniquely superior for Army calibration purposes?

Response.

1. The JRL "Locost 106" is a generic term which has had various definitions and specifications. It is necessary to be quite clear which version is being referred to in connection with a given procurement. JRL literature quotes prices from $30,000 to $154,000 for various versions. [Refer to Figure 2.] Much confusion and contention has arisen from mistaken application -- the wrong price for the wrong unit -- by both the Army and JRL.

The technical uniqueness of the JRL equipment has been the source of acrimonious comment and refutation. The specific components used in the 1974 LAC proposal by JRL, Hewlett Packard, and Fluke are shown in Figure 3. It should be noted that while the DC/low frequency calibration section of these systems use different components, JRL uses many purchased components which are similar to those of the competitors in the oscilloscope/frequency calibration section. JRL also uses a Hewlett Packard computer. Hence JRL does not appear to be especially unique from a hardware standpoint.

JRL also claims to have a superior, faster method of software preparation. This claim, while it may have some merit, needs to be considered in the following context:

a. Software programs need only be written once, not with each use;

b. Competitive software programs provide more maintenance documentation than the JRL programs; hence require longer times to write.

c. The software system used in a "generic" type which, while efficient, requires higher skill than more specific systems; and finally,

d. The "generic" software concept is hardly unique to JRL.

In summary, the JRL equipment is not unique in any significant way. Neither is it especially "high technology" in the sense of being very modern or novel. Virtually the identical equipment is being offered today that was first offered to the Army in 1974. [Reference to Figure 4.]

On the other hand, if the JRL equipment meets its asserted specifications, there is no reason why it cannot perform a certain portion of the calibration functions in the DC and low frequency portions of the Army's requirements. "Uniqueness" and "high technology" are neither inherently merits nor demerits within the calibration procurement process.

Issue 6. What can be said about the various claims and counter-claims with respect to economics, models and cost savings?

Response.

The Army does not yet have an adequate data base, even after substantial effort to introduce improved reporting, from which to make acceptable cost savings analyses. It must be kept in mind that this data base involves at least 750,000 instruments and over 1,200,000 calibration and/or maintenance actions per year worldwide.

The criteria for such cost elements as turn-around time, transportation, calibration set up time, standard maintenance time-to-repair, spare parts stockage levels regrettably are not well-established or verified. Labor costs, including overhead allocation, training costs, and turnover rates are better defined. But labor productivity, especially in field locations with widely varying workload is not well defined.

This state of affairs is what gives rise to the widely varying estimates of cost savings you have seen.

The very large cost savings potential suggested by JRL appear to rest on overly-simplified and unrealizable assumptions of steady throughput at all sites of the optimum instrument types. The Army refutations err in the other direction, failing to adapt their calibration methods and instrument designs and inventories to allow cost improvements to be attained via adoption of automation.

The unfortunate truth, at this time, is that we simply do not know how much cost savings is attainable.

We intend to find out. As part of the studies I will describe in the next part of this statement, we intend to get the data and cost elements which we don't now have. And we intend to make the cost analyses that are required. As you will see in a moment, though, there is more to it than just automation of calibration.

Issue 7. What do I conclude on the basis of this investigation regarding TMDE calibration and repair activities?

First, consideration of the subject must start with matters which come well ahead of decisions regarding calibration and repair procurement.

a. The design of primary operational equipment, especially electronic systems, requires full consideration of testing calibration, and maintenance. Major opportunities exist, and are being realized in many new systems, to incorporate the test equipment calibration and maintenance in the primary equipment -- thereby avoiding or minimizing the need for external calibration and repair facilities and manpower.

b. The concept of field maintenance below the card level needs to be reexamined carefully to determine the most economical maintenance practices. Throw away cards and card and box level stockage will be re-examined as alternate techniques. CONUS operations of this sort could probably utilize more highly automated concepts of calibration and repair.

c. The Army needs to reconsider its allocation of overall costs between initial acquisition cost and maintenance cost. It seems entirely likely that additional investment in higher reliability parts, redundant circuitry, and "graceful degradation" design could yield significant reduced life cycle maintenance cost and overall ownership cost.

d. For test equipments which continue to require external calibration and repair, provisions should be incorporated to utilize standard test connections. This will facilitate the adoption and use of automated test set, calibration and diagnostic techniques.

e. It may be technically feasible and economical to perform calibration and diagnostic functions at a distance thereby avoiding transportation and down time and providing more frequent service. While the concept is more futuristic, perhaps, than the other concepts cited, it is not different in principle from commercial services currently offered on computers in similar equipment in the US.

Second, the Army concludes from this investigation that it is necessary to reorganize further the TMDE function. While the current organizational arrangement is a significant improvement from prior assignments, the DAIG investigation has revealed shortcomings. Accordingly, a review of the Army's total TMDE functions will be undertaken which will encompass the following issues and concepts:

a. What revisions to regulations and provisions for review need to be made to ensure full, competent advocacy and execution of TMDE concepts, equipment acquisition and performance monitoring? It is evident that strengthening of this function is required.

b. What scheme best serves the field calibration and repair function -- fixed-base or mobile?

c. What performance and reporting measures are feasible to verify the operational readiness of primary equipment and systems as they are affected by calibration and maintenance?

d. How should the Army go about the elimination of obsolete test equipment from its inventory? And how should it phase out the burden of maintaining calibration equipment and spare parts to serve this test equipment?

4. The Army plans to conduct an intensive review of these matters and intends to produce, as a result of this review, an implementation plan for the indicated changes. The review and plan are due to be presented to me on March 15, 1982.

The review will be conducted by the Assistant Secretary of the Army for Installations, Logistics and Financial Management. He will be assisted by the Assistant Secretary of the Army for Research, Development and Acquisition, the Deputy Chief of Staff for Research, Development and Acquisition, the Deputy Chief of Staff for Operations and Plans, and the Deputy Chief of Staff for Logistics. All affected Army major commands will participate as required.

5. The performance of the procurement function in this area of equipment, as revealed by the DAIG investigation, is marginal in its adherence to the intended spirit of the procurement regulations. There is no indication that this is a general phenomena, and there is some indication that this outcome was affected by the personalities involved and the approaches taken on both sides.

Effective immediately, the calibration procurement personnel involved at MICOM are assigned other equivalent duties, and this area of equipment purchase is assigned to another MICOM purchasing branch.

An in-depth review of the responsibilities and performance of individuals involved will be undertaken under the direction of the Commanding General of DARCOM, General Donald Keith.

General Keith has already approved the establishment of an element under the supervision of LTG Harold F. Hardin, Jr., Deputy Commanding General for Materiel Readiness, DARCOM, which will provide better management and oversight of TMDE, including issues involved in this inquiry.

6. Careful consideration will be given to possible changes in the Army implementation of the Defense Acquisition Regulation which could contribute to improved performance generally in this area. The Commanding General of DARCOM will shortly issue a letter to all procurement functions reiterating the Army's intent to adhere to the spirit as well as the letter of the Defense Acquisition Regulations.

7. The Ridge contract for AC calibrators of September 4, 1981, is being terminated for the convenience of the government.

Response of Mr. Ambrose to Written Questions Submitted by Senator Roth

Question 1. What action has the Army taken in response to the GAO report of April 3, 1981? Has the Army re-examined its needs to determine the extent to which automated equipment can replace manual equipment in field Army calibration units as GAO recommended? If not, why?

Answer. Secretary Marsh has directed an extensive study of calibration procurement and related issues. The committee is headed by Mr. Joel Bonner, Assistant Secretary of the Army for Installations Logistical and Financial Management. Their report is due in mid-March.

Question 2. Did the Inspector General, the Air Force or the Army develop the actual calibration/repair workload, by location and by category of test, measurement, and diagnostic equipment? What is that workload? When can we expect data base figures?

Answer. The US Air Force Aerospace Guidance and Meteorology Center report, produced at the request of the Secretary of the Army, estimated that portion of the Army's calibration workload which could be addressed by the JRL Locost 106 equipment using White Sands Missile Range information. The DAIG report commented that this estimate/method was probably too inaccurate to be conclusive. The DAIG investigation did not develop an actual calibration repair workload data base. The DAIG report concurred with the 15 April 1981 GAO report to the effect that such a workload data base, by location and category (calibration parameter) was not readily available but would be helpful when developed to reliable accuracy.

The worldwide density of TMDE is approximately 589,000 items which equates to an annual workload of over one million calibration and repair actions.

A comprehensive assessment of the Army calibration program is currently being made and will include a review of workload at each location to reassess the potential for automation of calibration support. This assessment is scheduled for completion in mid-March 1982. The data base figures will be available at that time.

Question 2a. Isn't it true that the Army has been buying calibration equipment since the early 1970's without knowing its real needs? Don't you need to know the workload before you can competently buy equipment?

Answer. The answer to both questions is "Yes."

Question 3. There have been reports that the Army calibration program is in serious disarray. Some reports allege that calibration equipment has been cannibalized, that equipment is no longer calibrated as often as it should and that calibration technicians must work overtime to handle the excessive overload of equipment needing calibration. Did the Army know about these problems? If you did, why did you just recently send a special team over to Europe to investigate these problems?

Answer. There have been achievement shortfalls in the current calibration and repair situation in Europe which HQ DARCOM is working to overcome. Generally, the situation was much improved when the DAIG investigative team visited several sites in Europe in August 1981 from what it had been in 1978–80 when the two cartoon books' material was being gathered by JRL.

Question 4. The IG report states that with regard to the Direct Current and Low Frequency (DC & LF) function 46.6 percent of TMDE and 54.8 percent of the calibration workload falls into this parameter. My understanding is this is precisely what JRL equipment does? Don't these figures clearly establish a need for this type of equipment?

Answer. The figures cited from the report identify the percentage of TMDE in the general category of DC and Low Frequency. The presence of an Army inventory of DC and Low Frequency instruments which must be calibrated does not automatically validate JRL's assertions that his brand of automated calibrators represent the best way to accomplish the necessary degree of calibration. The Army needs calibration instruments, but JRL equipment must compete for an applicable portion of this market. The DAIG report indicated that JRL must be assured of a full and impartial opportunity to compete.

Question 5. The DA Concept Study for Improved Army-Wide TMDE Calibration and Repair Operations was focused on the field Army, and when approved in 1978 made substantial changes in the Army Calibration Program. Prior to this time the calibration-and-repair missions in the field Army were separated. The concept study resulted in the consolidation of all levels of calibration-and-repair missions into one office, DARCOM. This concept study was merely an idea paper. It was designed to identify how much calibration equipment the Army would need theoretically if it did not have any. Yet, it became the basis for massive procurements of calibration equipment and realignments of Army lines of authority. No "Required Operational Capability" (ROC), which is an actual program plan for new changes in Army operations, was ever approved for any of these procurements as required by Army regulations. Why did this happen? Isn't the Army buying calibration equipment based on a set of theories and no real plans? Who was responsible for approving the go ahead for all these procurements? Shouldn't they be disciplined?

Answer. On November 10, 1981, the Commanding General of the U.S. Army Material Development and Readiness Command (DARCOM) appointed a General Officer to investigate under Army Regulation 15-6 whether the acquisition of calibration devices was conducted in accordance with applicable rules, regulations, policies, and established procurement practices. This investigation is on-going.

Question 6. Isn't there a serious problem when senior personnel allow either consciously or inadvertently inaccurate, unproven and inconsistent information in official reports to reach GAO, Congress and Army headquarters? Why has this happened?

Answer. Yes, if such misinformation has been disseminated we believe such actions would be counterproductive to the Army's mission and realization of its responsibilities. Whether such actions have taken place and the identify of individuals involved are the subjects of the 15-6 investigation.

RESPONSES OF MR. AMBROSE TO WRITTEN QUESTIONS SUBMITTED BY SENATOR D'AMATO

Question 1. The Army Maintenance Management Systems (TAMMS) controls the calibration of Test, Measurement, and Diagnostic Equipment (TMDE) in the Army. It includes a computerized list of all Army equipment requiring calibration. It uses this list to schedule calibration by type of equipment, and to require reports showing completion of the required calibrations. Please explain why data cannot be gathered from this system to produce a comprehensive, accurate picture of the Army's calibration needs.

Answer. The TAMMS system does contain information on all TMDE in the field Army requiring calibration. The TAMMS system does not contain information from all Army internal mission facilities in support of research and development, procurement and production, and similar activities. The TMDE part of TAMMS was designed to control, schedule, and collect information by specific make, model, and serial number. However, the data in the TAMMS file is not in a format that will allow automated recall by type or generic category (i.e., meters, signal generators, etc.). This information is currently available only through a combination of computer sorting and manual assessment. The European experience of the last two years would seem to prove this when they suffered a large, unexpected increase in workload. System modifications and programming changes are currently being explored to allow future automated retrieval of TMDE by generic categories.

Question 2. Can the Army produce an accurate forecast of its future calibration needs, based upon procurement plans for new weapons and equipment, working from the TAMMS data as a baseline?

Answer. An accurate forecast can be made once the new weapons system planning has progressed to the point where the TMDE requirements are firmly identified. During the early development phase, TMDE requirements are general and usually limited to the basic parameters to be measured. It should also be pointed out that increasingly, new weapon systems and support systems are incorporating built-in test equipment and are utlilizing division and depot level multi-purpose test equipment which has built-in calibration provisions. Hence, future requirements for separate calibration equipment will probably decline. The Under Secretary referred to this situation in his testimony (pg. 79) as follows: "They have got to look at ways first of all of getting rid of the need for calibration in the first place by building it into new systems and that is, in fact, going on in many cases already, and I think can be incorporated in even more."

Question 3. To meet the size standards necessary to qualify as a small business for the purposes of winning a contract under a small business set-aside, a small business must "make a substantial contribution to the end item" being procured under that contract. What are the Army's views on the situation which should constitute "making a significant contribution to the end item?"

Answer. The Small Business Administration has established rules and procedures for determining whether a business is a small business and whether it continues to maintain that status for purposes of a small business set-aside when it subcontracts a portion of the work. The General Accounting Office also makes determinations in the latter regard in certain instances, and the Department of Labor makes similar determinations under the Walsh-Healey Public Contracts Act. These agencies generally indicate that the key element is whether the small business firm is making or will make a significant contribution to the end item or service. They generally decline to specify a set percentage as binding in all instances as each case must be judged on its own merits. The fact that a small business firm assembles the products of larger businesses has in many circumstances been sufficient to meet the "substantial contribution" test. The Army follows the rules and decisions of these agencies and defers to their authority and expertise in this area.

Question 4. Would the Army be willing to make a recommendation for changes in Defense Acquisition Regulations, the Small Business Administration's regulations, or in statute law to clarify the situation? If so, what recommendations would the Army make?

Answer. The Army does not have any recommendations at this time which appear adequate to clarify this situation. The Small Business Administration has statutory authority for determining whether a business is a small business and for establishing the rules and procedures to be used in doing so. We would defer to the SBA's expertise and authority in this area.

Question 5. Does the Army take into account mobilization base requirements in the procurement of calibration equipment? If not, why not?

Answer. No. This has not warranted specific mobilization base provisions. There is, as you are aware, a general shortfall in establishing an adequate defense mobilization base.

Question 6. Does the Army have plans to develop a United States source for calibration equipment other than John Fluke, Inc.?

Answer. Other U.S. sources for calibration equipment than John Fluke, Inc., currently exist. For example, the Army recently solicited proposals for the procurement of automated meter calibration systems. As a result, multiple awards were made to all companies responding: the John Fluke Manufacturing Company, Roteck Instruments Corporation and Valhalla Scientific Corporation. Each contractor is to deliver one unit in 45 days for testing by the government. After an evaluation of the test results and a cost effectiveness analysis, a follow-on buy of hardware is contemplated.

Question 7. If any individuals are found to have been responsible for actions contrary to regulations in the course of the continuing disputes over the procurement of Julie Research Laboratories, Inc. products, will the Army take disciplinary action against them?

Answer. Yes, to the extent any such action is warranted under all the facts and circumstances and is in accordance with prescribed personnel.

Question 8. Will the Army continue to refuse to purchase Julie Research Laboratories, Inc. calibration equipment pending the conclusion of the review of Army calibration equipment procurement and employment which won't be completed until March 15, 1982? If so, on what basis?

Answer. The Army has not "refused" to purchase JRL calibration equipment. JRL did not bid in response to an RFP dated 14 January 1982 which was specifically intended to test automated meter calibration equipment, in an objective fashion as promised in the Under Secretary's testimony (pp. 112 and 133). The equipment characteristics claimed by Mr. Julie and by JRL specifications would appear to be entirely adequate to meet the terms of the RFP. The Army has no explanation for Mr. Julie's failure to respond.

Question 10. What impact would mobilization have on the Army's calibration requirements? Has that impact been taken into account in the purchase of the Army's present inventory of calibration equipment?

Answer. All of the TMDE in the deployable forces (active Army, National Guard and Reserves) is currently being supported by the National Guard and the active Army. In the event of full mobilization, all of the deployable forces would become active Army and each unit would deploy to its predesignated mobilization station. The impact on TMDE calibration and repair support at the time of full mobilization would be a redistribution of workload with a resultant need for redistribution of TMDE support assets. The impact of full mobilization was considered in the purchase of the present inventory of calibration equipment but higher Army priorities caused funding for 27 mobile sets to be slipped from fiscal year 1982 to fiscal year 1985-86. Additionally, 22 of the mobile sets programmed for CONUS use were unfunded and the planning was adjusted to satisfy these requirements using partial sets, tailored to site requirements, and configured from useful components of outmoded sets and from other sources.

RESPONSES OF MR. AMBROSE TO WRITTEN QUESTIONS SUBMITTED BY REPRESENTATIVE WEISS

Question 1. White Sands Missile Range did a report on the Julie Locost automated calibrations system in which it tested the Julie system against its automated competitors, from my reading of their report, by H.F. Gonzalez. Yet Secretary Ambrose declared during the hearing that the White Sands test did not match Julie's equipment against automated equipment (pps. 89, 133). Please explain what was unsatisfactory about the White Sands test, and why it should not stand as the authoritative word on the comparative usefulness of the Julie Systems and his competitors'.

Answer. The evaluation conducted at White Sands Missile Range (WSMR) during April-June 1981 was directed by the Director of Product Assurance, DARCOM, and its purpose was to evaluate the performance of the JRL LOCOST 106 system in the WSMR environment. The evaluation was basically to compare the production performance of the JRL equipment against the manual method of servicing the same TMDE in the WSMR environemnt. The evaluation was not a comparision of the JRL equipment against any other competing equipment in current use. In the report, WSMR included a table comparing JRL LOCOST 106 service time to that of older model Hewlett Packard and John Fluke Systems, using 1976–1978 data, which were not obtained on an objective, controlled basis. Hence this table does not constitute "the authoritative word" on the comparative usefulness of the competitive equipments.

Question 2. Secretary Ambrose also declared during the hearing that the Julie equipment is not unique, and performs only as well as comparable equipment, not better (p. 63 of transcript). Yet the Secretary formerly was employed as Vice President for Technical Affairs for Ford Aerospace Communications Corporation, and was involved in Ford/Philco support services in Vietnam, according to his biography. The Ford/Philco company and/or the Ford Aerospace corporation owns and uses Julie calibrations equipment, precisely the equipment that is the subject of this hearing and this controversy. From Mr. Julie's account, that corporation is very pleased with his equipment, and has actually compared it to the competitors' in objective tests and found it to be superior in every way. Is Secretary Ambrose aware of that fact? How does it affect his opinion of the Julie equipment?

Answer. I was not familiar with this equipment while employed by Ford Aerospace. Subsequent to the Senate hearing, while at Ford Aerospace for a DIVAD program review, I looked at the Julie equipment and talked briefly with the using personnel. It is my understanding that this equipment was transferred to the using Division from another Ford Aerospace Division at the termination of a government contract for which it had originally been purchased with Company funds. (The contract for which the equipment had originally been purchased, was for calibration work at a National Test Range.)

The transfer to the second Ford Division was at the then depreciated book value, in accordance with company accounting procedures, so that it was, in effect, obtained for its current use at a reduced price. The Ford experience with the equipment is that it works reasonably well technically vis-a-vis its claimed specifications, requires a moderate amount of maintenance, and requires about twice the time per calibration claimed by Mr. Julie. They use it in a general purpose fashion and have no reason to expect, nor do they achieve the large dollar savings claimed by Mr. Julie. Nonetheless, they are generally satisfied with the equipment and the cost savings actually realized. There was no indication that they considered the equipment unique or unusually proficient.

Question 3. After the White Sands report was completed, the Army asked the Air Force to do another test of the Julie equipment. Was the White Sands test not satisfactory? Please submit the Air Force test for the record. Was the Air Force test one that measured comparable equipment at comparable levels of performance, or did it measure apples and oranges?

Answer. Air Force was asked to provide an objective, 3rd party look at the Army's calibration program. As part of their review, they asked and were authorized by the Army to test the Julie equipment at White Sands utilizing their own personnel. Their request and subsequent test was not the result of an unsatisfactory White Sands test.

Question 4. Why does the Army lack accurate figures on its calibrations workload? Shouldn't the TAMMS reporting system, under which Redstone Arsenal receives a report of every calibration performed worldwide, insure that such information is available?

Answer. The TAMMS reporting system does provide accurate information related to this workload. The issue raised by the question relates to a finding that workload data was not available in a format requested by the GAO and me at the time of the hearing in November. This information concerning generic categories of equipment is currently available through a system of partially automated and manual sorting and will be available on a fully automated basis when ongoing system changes are fully implemented.

Question 5. Has thorough testing, similar to that now suggested before buying Mr. Julie's equipment, been done in the past on all calibrations equipment purchased by the Army before purchase? Should such testing be done in the future?

Answer. At the hearing, the Under Secretary addressed this issue at pp. 112 & 113, as follows:

"Senator (Rudman), I don't have any problem with doing a fair test of Mr. Julie's equipment and the equivalent competitive equipments."

"It is my view, first we ought to make very sure we have a fair objective test. That one has led to more contention than it has settlement of these questions. So before doing anything in this, I want to see to it that we have a fair set of specifications or measures and (b) an evaluation process and people that I can count on to give me an objective and impartial representation."

Subsequent to the hearing, it was determined that an appropriate test, combined with potential subsequent use of the winning equipment would be both such an objective test and of continuing benefit to the Army. Although this plan was devised specifically as a result of the Committee's discussion, JRL did not respond to the procurement request and, therefore, is not included in the test program. There is no other planned test of JRL equipment. The Army's general practice has been to buy commercial equipment and to perform only first article acceptance testing in accordance with the supplier's specification. The maximum possible extent, the Army intends to continue this practice in the future, rather than undertake research and development testing of this kind of equipment.

Question 6. Regarding the June 1980 contract with Ridge Instruments for 87 calibrations van sets: that contract was protested by Mr. Julie and by Congressman Weiss, yet it was let because of a supposed urgent need for the material involved. In light of Secretary Ambrose's comment that urgency was not an adequate justification for hurried procurement of 52 AC calibrators recently (also from Ridge), was urgency an adequate reason for the Army's behavior in the 1980 contract? Can that contract be reopened, at least partially, for rebidding and reprocurement? Why or why not? How much has been spent, how much is obligated, how many items have been delivered?

Answer. The FY 80 contract with Ridge for the 87 calibration van sets was a three year multi-year contract which provided for procuring 18 sets the first year, 30 sets second year and 39 sets the third year. In addition the contract provided for options within each of the fiscal years. Only the first two years of the three year multi-year contract were executed by the government for a total of 48 sets. Additionally, options were exercised for one additional set in each of the first two years making the total procured against the contract 50. The government did not exercise the third year quantity of the multi-year contract because funds were not appropriated.

Urgency was considered an adequate reason for the Army's action in the 1980 contract since deployment of these sets had already been scheduled. One active Army TOE unit was scheduled for deployment in the division level beginning in March 1981. The first ten sets of this requirement were committed to partially fulfill that obligation. The delivery of additional sets was considered to be critical toward meeting commitments and requirements at Fort Hood and Fort Riley in September 1981. This rationale plus other supporting data were processed through DARCOM to DA for approval to award pending resolution of the protests existing at that time. Approval was granted. The GAO subsequently denied the protests.

The contract cannot be reopened for rebidding and reprocurement since delivery is completed except for final unit which is scheduled for delivery in April 1982. The amount spent is $13,197,915.82 as of 17 February 1982 and $14,020,332.25 has been obligated. Forty-nine sets have been delivered.

Question 7. Ridge Instruments is located in Huntsville, Alabama, where the Redstone Arsenal and the Army Metrology Calibration Center is located. Do any AMCC or Redstone personnel, past or present, have financial interests in Ridge, or in John Fluke Co. or the Hewlett-Packard Company? Are any AMCC personnel, past or present, related to employees or directors of those two companies, or Hewlett-Packard? Are Ridge, John Fluke and Hewlett-Packard linked in any way through interlocking directorates, common major stockholders, or other formal linkage? Are any AMCC personnel, past or present, employed by any of the aforementioned three companies? Who and how many, and in what positions?

Answer. We presently have no information which would provide the information sought by these questions. An investigation is ongoing.

Question 8. In regard to the latest contract awarded to Ridge Industries, now terminated (the $680,000 contract), could you please furnish the original bids by each of the interested companies; the final bids, bid as "best and final offer"; and the difference between the Fluke price for this material, when sold to Ridge, and the Ridge price to the Army?

Answer. The requested information is at Inclosure 1. Information relative to the John Fluke price to Ridge is not available to the Army.

Question 9. Again regarding the June, 1980 procurement for 87 van sets: Secretary Ambrose has admitted that there is no reason to believe that the Julie equipment does not work as advertised. Yet he stated (p. 118–9) that the manual equipment purchased in this procurement must be retained. Mr. Julie has said his equipment would do the job now done by the van sets. Please explain why his equipment could not suffice in place of the van sets, and perform as advertised.

Answer. The van sets referred to include a number of equipments which perform tests and calibrations which cannot be performed at all by JRL or other automated equipment. Examples are: distortion analyzer, ocilliscope calibrator, gauge block weights, spectrum analyzer, ignition simulator, pressure gauge tester.

The Under Secretary's comment was intended to refer to the fact that these van sets are assembled to test a very wide variety of equipments, not just those encompassed within the capabilities range of JRL or other automated calibration equipment. Hence, there will always be a requirement for some assemblage of manually operated calibration equipment.

INITIAL AND FINAL BIDS ON TERMINATED RIDGE CONTRACT

Firm	Line item[1]—				Total price
	0001	0002	0003	0004	
Initial proposals (July 6, 1981):					
Aul Instruments, Inc	$12,078.00	$15,000	$7,500	([2])	$650,556
ARGO Systems	1,6,165.00	1,029,723	34,616	$90,501	1,995,420
Julie Research Labs	12,600.00	25,150	29,800	4,950	715,100
Julie Research Labs (Alt.)	14,150.00	27,700	29,800	4,950	850,250
Ridge, Inc	11,110.00	19,890	12,000	([2])	609,610
Best and final offer (Aug. 25, 1981):					
Aul Instruments, Inc	11,500.00	45,000	11,000	([2])	654,000
ARGO Systems	19,008.00	783,920	35,501	92,118	1,899,955
Julie Research Labs	12,474.00	25,150	29,800	4,950	708,548
Julie Research Labs (Alt.)	14,008.50	27,700	29,800	4,950	790,892
Ridge, Inc	11,195.00	18,000	12,000	([2])	612,140

[1] Line item and description: 0001—52 each, AC precision calibration systems; 0002—First article; 0003—New equipment training; 0004—Data and reports.

[2] Not separately priced.

RESPONSES OF GENERAL SOLOMON TO WRITTEN QUESTIONS SUBMITTED BY SENATOR ROTH

Question 1. Did Seymour Lorber participate in the selection of Motorola as the supplier for the Army's SOTAS (Stand-Off Target Acquisition System) Program? What was the extent of his participation in the performance and subsequent termination of that contract? Specifically, did he participate directly or indirectly in any of the negotiations with Motorola involving the possible relaxation of specification requirements, additional funding of the SOTAS program, the attempted imposition by the Army of a mandatory ceiling price, or the termination of that program? Provide the committee with an estimate of what portion of the $100 million paid to Motorola will be recoverd by the Army.

Answer. Mr. Lorber did not participate in the selection of Motorola as the supplier for the Army's SOTAS (Stand-Off Target Acquisition System) Program. Further, he was not a member of the Source Selection Evaluation Board or the Source Selection Advisory Council nor did he participate in any way with follow-on actions mentioned above.

Question 2. What procedures were followed in determining that there have not been any kickbacks in connection wih the previous calibration procurements? Specifically, how did you determine that those companies, such as Ridge and Fluke, that received contracts did not engage in any of the prohibited practices set forth in AR 600-50?

Answer. The DAIG conclusion on this matter was that there was no evidence beyond one hearsay allegation involving uncorroborated comment during a social hour several years before. When the DAIG inquiry questioned witnesses under oath on this point, none revealed any information of any kind to substantiate in any way the speculative allegation, which was, "Army purchases of calibration equipment are so obviously wrong, it can't be plain dumbness; somebody upstairs has to be getting a kickback." It is emphasized that the DAIG inquiry addressed JRL involvement, not other firms or other contracts.

Question 3. Page 9 of the IG Summary Report refers to "various Army officials that prepetuated certain misconceptions concerning JRL equipment and have permitted wording to appear in official documents . . . which contained statements which were inaccurate, unproven and inconsistent." Please identify the officials by name, provide a detailed explanation of their roles in the Julie case and the specific corrective and/or punitive action that has been or will be taken.

Answer. These matters are still subject to inquiry by the responsible officials/commanders. It would be inappropriate and premature to disclose information of this nature at this time, pending final determinations.

Question 4. In connection with the 1981 contract award to Ridge, provide the exact model numbers and the cost to Ridge of the Fluke equipment to be supplied by Ridge to the Army. In addition, provide a complete bidding history for the 1981 award to Ridge with the bids broken down by individual bidders for both the initial and final rounds. What is the cost of the Fluke equipment as sold to Ridge and what is the cost of the same equipment as sold commercially?

Answer. The exact model numbers of the John Fluke equipment to be furnished according to Ridge's proposal dated 6 July 1981 is as follows: Fluke Model 5200A, AC Calibrator; Fluke Model 5215A, High Voltage Amplifier.

The proposal states this equipment ". . . will after certain changes and additions meet the specifications of MIS-34786A." The cost of the Fluke equipment has not been identified. This was a competitive procurement and there was no request for cost data/cost breakdown issued. The bidding history is reflected on the next page, showing the initial proposal amounts and the best and final offers. A John Fluke commercial catalog price list for 1980-81 shows the cost for these items as follows: 5200A, $5,995; 5215A, $4,995; Price when bought as a unit, $10,595. A revised price list dated 1 October 1981 lists the units as follows: 5200A, $8,125; 5215A, $6,715; Price when bought as a unit, $14,595.

Question 5. In connection with the 1980 award to Ridge, what changes if any were introduced by Ridge to the materials called for by the original solicitation? Specifically, did Ridge request authorization to supply components other than those specified by the Army and what was the final disposition of any such request? If changes were authorized, advise the committee whether any action was taken to insure that possible cost savings resulting from the substitution were passed on to the Government. Further, in connection with the 1980 award to Ridge, provide the current status of that procurement to include the date of First Article approval or, if waived, the date of such waiver, the current undelivered quantities, and a complete breakdown of the Army's experience with Ridge in seeking to exercise its rights under the contract for warranty service. Under the 1980 Ridge award, what is the total cost of the equipment which is purchased by Ridge for inclusion in the end items delivered to the Army?

Answer. In response to this question, it is pointed out that this procurement was solicited on an Invitation for Bid (IFB) basis, and as such, no cost data is required. There were no changes introduced by Ridge prior to award of the contract. Since award of the contract there have been 28 Engineering Change Proposals (ECPs) submitted by Ridge. Of this number, 5 were disapproved. Of the remaining 23, 12 have resulted in changes to the components originally specified. The need for these changes include improvements in equipment performance, better location of equipment parts, and improved system specifications. The remaining 11 ECPs were issued due primarily to a manufacturer no longer producing an item and a new source having to be specified and for correction of drawing errors. Four ECPs were approved which increased the total price of the contract by $84,832. No ECPs were submitted by Ridge that resulted in a cost savings. The $84,832 increase as a result of the ECPs would not have changed the rank order of the original IFB proposals. The current status of the procurement is that all items contracted for have been delivered except one AN/GSM-287 set. First article approval was initially required on 14 components with a provision that additional components could be tested if desired by the government. Modification P00005 (13 January 1981) added 1 item for testing and Modification P00009 (19 March 1981) deleted 5 items from the original list. Approval of the final first article component was given in July 1981. Under the warranty provisions of the contract, the government has the right for a period of one year to require replacement/repair of any defective components. There are no problems being experienced with the warranty provisions of the contract. As stated in the first sentence, this procurement was made as an IFB and no cost data was required to be submitted. Therefore, no data is available to provide cost of equipment purchased by Ridge, Inc.

Question 6. Is there any evidence that the problems revealed in this case have affected other small businesses trying to contract with the Army? Are there problems in the procurement actions of the Redstone Arsenal which run deeper than this case?

Answer. The investigation under Army Regulation 15-6 may provide answers to this question. Additionally, the study directed by Secretary Marsh, supported by a working group chaired by ODCSLOG is believed to be addressing systemic issues of the type alluded to. Their report is due March 15, 1982.

Question 7. Whom did the Army IG rely on for technical assistance in doing this report? Were they people with a background in calibration automated measurement and electronics engineering? Were they people who were totally removed from any involvement in this case?

Answer. Areas of experience tapped by the Army IG investigators include calibration, automated measurement and electronics engineering as well as procurement, auditing, cost analysis and maintenance management. No IG personnel or augmentees had had any previous involvement with this case.

Question 8. Did the Inspector General, the Air Force or the Army develop the actual calibration/repair workload, by location and by category of test, measurement and diagnostic equipment? What is that workload?

(a) Isn't it true that the Army has been buying calibration equipment since the early 1970's without knowing its real needs? Don't you need to know the workload before you can competently buy equipment?

Answer. The U.S. Air Force Aerospace Guidance and Metrology Center report—produced at the request of the Army Secretary—estimated the portion of the Army's calibration workload which could be addressed by the JRL LOCOST 106 equipment using White Sands Missile Range information; the Army IG report commented that this estimate/method was probably too inaccurate to be conclusive. The Army IG investigation did not develop an actual calibration/repair workload data base. The IG report concurred with the April 15, 1981 GAO report to the effect that such a workload data base, by location and category (calibration parameter) was not readily available but would be helpful when developed to reliable accuracy.

The Army initiated procurement of existing calibration equipment sets based on the best workload performance and planning data available at the time that the Army's revised test equipment support concept was being developed. The Army made a decision to upgrade and buy additional numbers of existing calibration sets as opposed to significant automation of support requirements. This decision not to increase automation, and the basis for making it, is currently under review within the Army.

Question 9. The DA Concept Study for Improved Army-Wide TMDE Calibration and Repair Operations was focused on the field Army, and when approved in 1978, made substantial changes in the Army Calibration Program. Prior to this time, the calibration-and-repair missions in the field Army were separated. The concept study resulted in the consolidation of all levels of calibration-and-repair missions into one office, DARCOM. This concept study was merely an idea PAPER. It was designed to identify how much calibration equipment the Army would need theoretically if it did not have any. Yet, it became the basis for massive procurements of calibration equipment and realignments of Army lines of authority. No "Required Operational Capability" (ROC), which is an actual program plan for new changes in the Army operations, was ever approved for any of these procurements as required by Army regulations. Why did this happen? Isn't the Army buying calibration equipment based on a set of theories and no real plans? Who was responsible for approving the go ahead for all these procurements? Shouldn't they be disciplined?

Answer. On November 10, 1981, the Commanding General of the U.S. Army Material Development and Readiness Command (DARCOM) appointed a General Officer to investigate under Army Regulation 15-6 whether the acquisition of calibration devices was conducted in accordance with applicable rules, regulations, policies, and established procurement practices. This investigation is on-going.

DEPARTMENT OF THE ARMY
OFFICE OF THE INSPECTOR GENERAL
WASHINGTON, D.C. 20310

REPLY TO
ATTENTION OF:

3 NOV 1981

SUBJECT: Summary Report of Inquiry into the Facts and Circumstances Related to Allegations of Improper Procurement of Calibration Systems for the Army by the US Army Metrology and Calibration Center (CALIBRATION 10-81) - Based on Draft ROI as of 30 October 1981

The Inspector General
Headquarters, Department of the Army
Washington, DC 20310

EMBARGOED UNTIL:
THURSDAY, NOVEMBER 5, 1981
9:00 AM EST

SUBJECT: Summary Report of Inquiry into the Facts and
Circumstances Related to Allegations of Improper
Procurement of Calibration Systems for the Army by
the US Army Metrology and Calibration Center
(CALIBRATION 10-81) - Based on Draft ROI as of
30 October 1981

The Inspector General
Headquarters, Department of the Army
Washington, DC 20310

I. AUTHORITY

1. This inquiry was conducted during the period 4 May-30 October 1981 by COL Charles W. Gomon, COL Arlene Burbank, LTC Curtis R. Morton, and MAJ William Waller, Inspectors General, Office of The Inspector General, Headquarters, Department of the Army, pursuant to a 30 April 1981 Inspector General directive. Additional matters are being considered for integration in the Final Report of Investigation to be completed no later than 16 November 1981.

II. MATTERS INVESTIGATED

2. Scope. This inquiry was conducted to determine the facts and circumstances related to allegations of improper procurement of calibration systems for the Army by the US Army Metrology and Calibration Center, a subordinate element of the US Army Missile Command (MICOM), located at Redstone Arsenal, Huntsville, Alabama.

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III. BACKGROUND

3. Development of the Issues.

a. In August 1980, Mr. Loebe Julie - president of Julie Research Laboratories, Inc. (JRL), of New York City, a small business manufacturer of precision measurement and calibration instruments - distributed a pamphlet illustrated by a political cartoonist, Mr. Richard Hafer. This Julie-Hafer cartoon book described through caricature what Mr. Julie subsequently alleged in sworn testimony was his "seven year series of frustrating events trying to sell calibration advanced technology to the Army and to get answers to questions that we raised concerning procurement of calibration equipment and apparent waste of money on the wrong calibration technology." This pamphlet, which the IG Inquiry referred to as Julie-Hafer Cartoon Book One, was distributed to members and committees of the Congress, to President Carter, to presidential candidate Mr. Reagan, to 12 other officials and agencies of the Executive Branch, and to news media. Among the actions catalyzed by Book One was a request by Congressman Addabbo (NY) that the General Accounting Office (GAO) investigate matters raised in the cartoon book concerning Army calibration; GAO issued a report dated 3 April 1981. Several other members and staff offices of the Congress expressed their concern to the Secretary of Defense and the Secretary of the Army.

b. The Secretary of the Army commissioned The Inspector General to conduct an independent ("thorough, no-holds-barred") assessment of these matters. The Secretary of the Army concurrently asked the Secretary of the Air Force to assist by conducting a separate and independent assessment of technical and selected policy aspects of the JRL-identified matters. The Secretary of the Army also indicated his concern and his ongoing actions to members of the Congress.

c. In June 1981, Julie-Hafer Cartoon Book Two was distributed. Book Two reasserted the dissatisfactions and criticisms in Book One and added some new but related allegations. The primary theme of Book Two was that "Nothing is being done". Examination of the two cartoon books, an editorial in the August 1981 edition of Government Executive, and the GAO report revealed that the matters identified by Mr. Julie consisted of at least 58 separately identifiable allegations concerning procurement, policy, and management events in the calibration arena. These events occurred over a thirteen year period (1968-81) and involved eleven procurement-related actions. A three week preliminary reconnaissance in May 1981 revealed to the Inspector General (IG) team approximately 93 linear feet of file documentation immediately available at five geographically separated sites, about 50 potential witnesses, and the desirability of pursuing the allegations further, in that information appeared to be available upon which to base answers to the allegations.

d. Briefings concerning the nature and status of the IG Inquiry (prior to conclusions being reached) were presented to the acting Assistant Secretary of the Army for Research, Development, and Acquisition (ASA(RDA)) (11 June 1981), the Deputy Chief of Staff for Research, Development and Acquisition (DCSRDA) (1 July 1981), the Chief of Staff, Army (CSA) (16 July 1981), the Secretary of the Army (20 August 1981), the Under Secretary of the Army (21 August 1981) and the Assistant Secretary of the Army for Manpower and Reserve Affairs (ASA(M&RA)) (31 August 1981). On 27 August 1981, the Secretary of the Army directed that the investigative phase of the Army IG Inquiry be termined as expediously as possible and the results of the IG Inquiry be developed as soon as possible. On 2 September 1981 members of the US Air Force (USAF) Aerospace Guidance and Metrology Center (AFGMC) presented results of their separate inquiry to the Secretary of the Army. Army IG personnel did not contact the USAF effort while it was on-going and did not participate in the 2 September 1981 briefing for the Secretary of the Army; the Army IG and USAF efforts remained independent. On 4 September 1981 the IG Inquiry was requested by the Secretary of the Army to provide comments concerning the AFGMC report and to conduct an inquiry into allegations raised by Mr. Julie during the period 25 August-4 September 1981.

e. In addition to considering the 58 allegations individually, the IG Inquiry distilled and addressed four key issues and a central question.

(1). The four key issues were:

(a). Readiness: Is the Army at 64% calibration accuracy, which results in degraded readiness?

(b). Waste: Is the Army "Penny Wise and Pound Foolish" in the acquisition of calibration instruments, in that bad decision making has cost the government millions of dollars by purchase of "sub-standard, inefficient" calibration instruments while purchase of Julie-manufactured calibration equipment could achieve significant savings and/or cost avoidance during the next 10-20 years?

(c). Credibility: Have some elements of the Army misled JRL, the General Accounting Office, the Congress, and other parts of the Army concerning Julie Research Laboratories and calibration issues?

(d). Systemic: What systemic problems involving calibration instrumentation does the Army have in acquisition management and the operation of the Army calibration-and-repair systems?

(2). The central question raised by the total package of allegations: Was Julie Research Laboratories, Inc., afforded full and impartial opportunity to compete or, as Mr. Loebe Julie had alleged, was JRL's calibration equipment improperly excluded from meaningful competition?

4. Calibration and Repair.

a. The following discussion of a few of the aspects of Army calibration is helpful to a better understanding of the Army-JRL controversy:

(1). Metrology is defined as the science of measurement.

(2). Calibration is defined as the act of establishing the value of an unknown by comparing it with known value. Note: "calibration" does not include adjustments or repairs - it is the act of comparison.

(3). Accuracy is the deviation from a perfect, absolute, or known value.

(4). "Calibration Standard" is an item of equipment whose accuracy and values are established by a chain of measurements traceable to the National Bureau of Standards (NBS); thus, a "calibration standard" is not a goal, level of achievement or a number, it is an instrument.

(5). Test, Measurement, and Diagnostic Equipment (TMDE) as defined in Army Regulation 750-43, TMDE (Including Prognostic Equipment and Calibration Test/Measurement Equipment), 24 July 1975, is, "Any system or device used to evaluate the operational condition of a system or equipment to identify and/or isolate any actual or potential malfunction. TMDE includes diagnostic and prognostic equipment and calibration test/measurement equipment."

(6). Calibration equipment as defined in Army Regulation 750-25-1, Army Test, Measurement, and Diagnostic Equipment (TMDE) Calibration and Repair Program 10 October 1979, is, "Measurement standards, TMDE, and accessories used to perform calibration."

(7). The Army's requirements for calibration support and equipment are dictated by the spectrum of measurements inherent in the inventory of TMDE within the Army. This spectrum of measurements is broad; it ranges from motor vehicle support equipment to complex missile and communications electronic test sets. The spectrum of measurement is generally divided into the following parameters:

(a). Direct Current and Low Frequency (DC&LF). This covers direct current and low frequency alternating current electronic measurements. Low frequency is defined at 500 megahertz (MHz) and below. Examples of equipment within this parameter would be multimeters, oscilloscopes, and signal generators. According to information provided to the IG Inquiry, 46.6% of the TMDE and 54.8% of the calibration workload falls within this parameter.

(b). Physical/Mechanical. This covers measurements in pressure, vacuum, mass, length, viscosity, flow rate, torque, temperature and other physical dimensions. Examples of equipment in this parameter would be torque wrenches, mechanical scales, and micrometers. 35.2% of the TMDE and 29.3% of the calibration workload is physical/mechanical.

(c). Microwave (MW). This covers measurement above 500 MHz and extends into the far infrared (IR) frequency region. Examples of equipment within this parameter would be both fixed and variable attenuators, high frequency signal generators, and radio frequency resistors. According to information provided to the IG Inquiry, 9% of the TMDE and 8.3% of the calibration workload falls within this parameter.

(d). Radiac. This covers the measurement of radiation. 9% of the TMDE and 7.4% of the calibration workload is Radiac.

(e). Infrared (IR). This parameter covers the measurements of IR frequencies (except the small portion covered in MW). 0.2% of the TMDE and 0.2% of the calibration workload is in IR.

(8). A quick summary of the Army's structure of the transfer of known established values from NBS to the Army and a summary of how Army calibration-and-repair is structured follows:

(a). NBS, by statute, establishes all basic measurement values except time; the Naval Observatory establishes standard time. NBS certifies the values of certain measurement (calibration) standards maintained by the Army Primary Standards Laboratory (APSL) at Redstone Arsenal, Alabama.

(b). The APSL calibrates and repairs selected calibration standards for Area Calibration Laboratories (ACL) and Internal Mission Calibration Laboratories. ACL's are a section within an Area Calibration and Repair Center (ACRC). An ACRC is a company size unit tasked with providing calibration support to the Army on an area basis. This is accomplished through the ACL and Army TMDE Support Teams (ATST).

(c). The ACL calibrates and repairs ATST calibration standards and customer unit's TMDE whose accuracy or parametric requirements exceed the ATST's capabilities.

(d). ATST's calibrate and repair TMDE belonging to field Army units, support units, depots and Army industrial type operations. Basically, the ATST is the interface between the Army Calibration Program and the remainder of the Army.

(9). Current Army doctrine, according to DARCOM-AMCC/ATSG briefings and fact sheets, calls for calibration support to the Army in the field to be performed by an Area TMDE Support Team located with the divisional maintenance battalion in the division rear area. The type of division and its assigned support units will determine the numbers and specific types of TMDE requiring calibration-and-repair support. In addition to the field Army's requirements, various depots, industrial operations, and test evaluation facilities generate calibration-and-repair requirements. Generally, the parametric requirements of these activities are close enough to the field Army's parametric requirements that they present no technical problems, only a specific workload at a specific location.

(10). The DA Concept Study for Improved Army-wide TMDE Calibration and Repair Operations was focused on the field Army, and, when approved in 1978, made substantial changes in the Army Calibration Program. Prior to this time the calibration-and-repair missions in the field Army were separated and different levels of calibration were established with responsibilities assigned to separate units. The concept study resulted in the consolidation of all levels of calibration-and-repair functions for field Army TMDE into one mission which was assigned to the US Army Materiel Development and Readiness Command (DARCOM). Within DARCOM, this field Army support mission was assigned to the US Army Metrology and Calibration Center (AMCC) whose name was changed on 1 August 1981 to the US Army Test, Measurement, and Diagnostic Equipment Support Group (ATSG). The only exception was the Army National Guard, which retained operational control of its TMDE support capability. The IG Inquiry perceived that within DARCOM, however, few functional responsibility changes were made; the calibration activities of the internal mission laboratories were not brought under AMCC/ATSG supervision or control (AMCC/ATSG remained a sub-element of the US Army Missile Command (MICOM) - the internal mission labs remained in their parent commodity/functional commands of DARCOM).

(11). The concept of operations currently espoused in Army doctrine, according to DARCOM - AMCC/ATSG, calls for calibration-and-repair support to be provided to the field Army by mobile teams on an on-site basis. The IG Inquiry believes that in practice, during peacetime, this support concept has been significantly modified, despite the Army's announced intention to do in peacetime, as nearly as possible, what would be done in war. A substantial amount of the calibration-and-repair support provided to the Army in the field is being accomplished from fixed locations; presumably fixed locations result in better and more economical support — in peacetime. The majority of calibration and repair sites in Europe are "fixed or semi-fixed" sites. The term "semi-fixed" is used to indicate that while equipment has been off-loaded and installed in buidlings, the vans have been retained and the capability to become mobile in time of war is still an option. A fixed-site is one in which the people and equipment do not leave. The customer brings the TMDE to the fixed and semi-fixed sites. TMDE test and calibration equipment may be on the bench or it may be in vans outside. In either case, neither the vans nor the test equipment moves. On a mobile site or loop, vans travel to established locations which are designated and published for the customers' information. Mobile teams perform TMDE calibration and can accomplish repair incidental to calibration. Their repair capability is limited because they cannot carry large quantities of parts. If repair is beyond their capability, the team will evacuate the item to the nearest fixed or semi-fixed site. Fixed and semi-fixed sites in Europe, with the exception of the three laboratories, are capable of going into a mobile configuration — some of them in varying degrees of time. With the completion of the fielding of the M286 and M287 sets, which are mounted in M820A2 vans, it is the opinion of the IG Team that the "mobility capability" will have been maintained for calibration units. This does not include the previously mentioned laboratory sites. The repair function will not profit from these mobile assets in that USATESAE does not have a mobile capability for repair parts. This practice vs theory/doctrine aspect became an intense issue as part of the JRL-AMCC/ATSG controversy.

(12). In summary, the Army calibration-and-repair function is a complex, world-wide functional responsibility of DARCOM — the field Army support portion of which is delegated to AMCC/ATSG. The assumption of this total calibration-and-repair support mission, which in reality is now much larger on the TMDE maintenance (repair) side than on the pure calibration side, has been characterized by growing pains within the calibration community.

VI. GENERAL DISCUSSION

5. Four key issues which could be derived from the allegations are discussed as follows:

a. KEY ISSUE #1. Is the Army at 64% calibration accuracy, which results in degraded readiness? As nearly as the IG Inquiry has been able to determine, this 64% number as well as the other percentages mentioned in the cartoon books (95%, 80-85% etc) are arbitrary mathematical concepts that have little real world significance in the sense of indices of weapons system targeting accuracy — the readiness-oriented implication cited in the cartoon books. The 95% number was the accuracy level which the Army has expected manufacturers to maintain in their own factories while making Army equipment; for that purpose and in that situation, 95% remains the accuracy level - it has not been reduced.

b. KEY ISSUE #2: Is the Army "Penny Wise and Pound Foolish" in the acquisition of calibration instruments in that bad decision making has cost the government millions of dollars by purchase of "sub-standard, inefficient" calibration instruments, when purchase of JRL-manufactured automated calibration equipment could achieve significant savings and/or cost avoidance during the next ten to twenty years?

(1). The IG team did not determine with finality that money has been spent unwisely in calibration equipment acquisition, but it appears likely, in retrospect, that JRL's LOCOST 106 was a better system than it was given credit for being at AMCC/ATSG. In the IG view, the LOCOST 106 technology was prematurely eliminated from serious consideration over the period 1975-1980 -- for a variety of reasons related primarily in the confrontational atmosphere between JRL and AMCC/ATSG.

(2). In this sense, the IG Inquiry believes that in retrospect the Army was "Penny Wise and Pound Foolish" not to take the additional time and effort to fully explore the JRL LOCOST 106 technology.

(3). Estimating future cost savings and cost avoidance is a serious and often time consuming effort requiring adherence to logical procedures, assumption of reasonable conditions and disciplined analysis of costs. The IG Inquiry believes:

(a). The fact that JRL has claimed an extremely high life cycle dollar savings for the LOCOST 106 resulted in AMCC/ATSG dismissing the notion of any realizable cost savings of any significance — without taking the time and effort necessary to fully determine (substituting what AMCC/ATSG considered realistic data factors/projections if AMCC/ATSG believed that JRL's data factors were unrealistic) what the break-even factors would have to be.

(b). The cost model submitted by JRL, which details 17 variables, was justifiably criticised by AMCC/ATSG, however some of the errors and inconsistencies contained in the model were repeated by AMCC/ASTG and by the General Accounting Office. A sensitivity analysis of the JRL model, performed by the GAO shows a wide range of possible savings or losses depending on the assumptions made and the value assigned to the 17 cost variables. None of these efforts has established the absolute magnitude of potential life cycle costs savings.

(c). An attempt to resolve some of the questionable issues and cost factors should have been made by AMCC/ATSG before providing a decision as to whether, for the various types of Army calibration-and-repair activities (such as laboratories, calibration-and-repair centers, fixed-site-with-mobile-capability locations, mobile vans) there are realistically potential cost savings possible -- in the $200 million or $20 million or $2 million or $0.5 million range. Such an evaluation, coupled with a realistic hardware/software assessment of the JRL LOCOST 106 technology and other manufacturer's items, employed in the various environments mentioned above (in addition to the pioneer but limited WSMR evaluation) would facilitate a meaningful understanding of exactly what the LOCOST 106 and other systems can and cannot do.

c. KEY ISSUE #3: Have some elements of the Army misled JRL, the General Accounting Office, the Congress, and other parts of the Army concerning Julie Research Laboratories and calibration issues? JRL's contention that there has been a deliberately malicious campaign against JRL interests, by the Army, was not substantiated. But it appeared to the IG Inquiry that various Army officials on various occasions have perpetuated, at least unwittingly, certain misconceptions concerning JRL equipment and have permitted wording to appear in official documents going forward (i.e., to higher headquarters and thus eventually to the GAO, to members and staffs of the Congress and via the FOIA to JRL) which contained statements which were inaccurate, unproven, inconsistent, and/or otherwise open to various interpretations.

(1). Some of this inconsistency appears to have been inadvertent in that senior officials, seeking quick information from their technical experts, were not fully informed — the senior officials were sometimes more reassured than advised.

(2). Lack of information resulted from writers'/drafters' limited perspectives and undercoordinated positions, e.g., AMCC/ATSG cannot speak for all aspects of all Army calibration matters but in some of these events AMCC/ATSG statements appeared to do so.

d. KEY ISSUE #4: What systemic problems involving calibration instrumentation does the Army have in acquisition management and the operation of Army calibration and repair systems?

(1). Management of the Army Calibration Program involves a large number of players and a complex set of interrelated mission responsibilities. This has caused apparent problems in the area of program guidance and oversight.

(2). Acquisitions are apparently being made by ATSG without coordination with the Army Central TMDE Activity (CTA) prescribed by regulation; whether other Army calibration activities, such as DARCOM internal labs, are also doing this was not assessed fully during the investigation. The checks and balances and other benefits to be gained from a formal acquisition approval procedure appear to have been defeated by the procedures currently being followed by AMCC/ATSG. In the area of requirements determination, there appears to be no one central office with access to Army-wide needs who speaks for the Army on calibration requirements.

(3). The degree of reliance placed by contracting officers on recommendations and certifications of technical personnel, especially in the area of sole source procurement, in our opinion warrants attention. The lack of vigorous challenges of sole source recommendations (i.e., verification of "only source" assertions) on the part of procurement personnel in the contract review and approval process has not been supportive of the spirit of competition mandated by the Defense Acquisition Regulation.

e. The central question of this inquiry was: Did Julie Research Laboratories, Inc., have a full and impartial opportunity to compete?

(1). In the opinion of the IG team a preponderance of the credible evidence would show that JRL was not afforded, at least in the period since 1975, a full opportunity to compete on an equal footing with other vendors, in that a bias against JRL's interests (largely a result of JRL's aggressive marketing techniques combined with AMCC/ATSG's familiarity with other vendor products) existed at the US Army Metrology and Calibration Center as well as in the supporting procurement and legal staffs.

(2). The crux of the matter in layman's terms is, we believe, that AMCC/ATSG did not seriously evaluate or consider JRL's LOCOST 106 technology between 1975-1981 because AMCC/ATSG did not believe JRL's rhetorical-sounding claims and were alienated by what they perceived to be JRL's buy-it-my-way-or-be-thought-a-fool marketing technique.

(3). This IG opinion:

(a). Does not include nor imply any conclusion concerning whether JRL calibration equipment, automated or manual, would have prevailed in full and impartial product competition although information available provides some indications that it would.

(b). Does not imply that JRL necessarily had or has any "right" to a government contract either previously or in recompense.

(c). Does not obligate the government or its contracting officers to any JRL procurements.

(4). The points to be made are two: First, that in the opinion of the IG Inquiry, ample evidence was available to indicate that an atmosphere existed that gave rise to a perception by JRL that JRL equipment would not and did not receive a full and impartial opportunity to compete; such an appearance of impropriety is in contravention of the spirit of the DAR procurement regulations. Second, it is emphasized that JRL's marketing demeanor was perceived to be an inability or unwillingness to be fully participatory and forthcoming in the legitimate procedures of the procurement process; this perception was a significant contributing factor in the development of the adverse atmosphere.

Chairman ROTH. We have two additional sets of witnesses.

Since everyone is here, I think it would be better to proceed, rather than to have a break. So at this time, I would like to call Mr. Gonzalez, Mr. Lorber, and Mr. Rivamonte.

Gentlemen, if you would please stand and raise your right hands. Do you solemnly swear to tell the truth, the whole truth, and nothing but the truth, so help you God?

Mr. RIVAMONTE. I do.

Mr. LORBER. I do.

Mr. GONZALEZ. I do.

Chairman ROTH. Please be seated.

Mr Lorber, it is my understanding that you are the director of quality assurance of DARCOM, that is, the Department of Army Materiel Development and Readiness Command; in that capacity, you have full authority over the purchase of equipment for calibrations and have, on a number of occasions, authorized the sole-source purchase of calibration equipment. I would appreciate it if you would explain to the committee your position, your responsibility, and the role you have played in the procurement of automatic calibration material, particularly in view of the findings of the Inspector General on the treatment of Mr. Julie.

TESTIMONY OF SEYMOUR J. LORBER, DIRECTOR OF QUALITY ASSURANCE, DARCOM; HENRY F. GONZALEZ, TEAM LEADER AUTOMATION, WHITE SANDS MISSILE RANGE; AND JOSEPH RIVAMONTE, SUPERVISOR, SYSTEMS INTEGRATION DIVISION, METROLOGY AND LABORATORY DIRECTORATE, REDSTONE ARSENAL

Mr. LORBER. Yes, sir, Mr. Chairman.

As director of product assurance, I have staff supervision of the calibration program that DARCOM is responsible for. In that capacity I review and I observe, I determine the adequacy of the programs that we pursue, how we conduct our programs and how those programs are performing. With respect to your specific question, I do not authorize procurement, nor do I authorize sole-source procurements. Those are responsibilities that rest within the procurement functions of our command.

I am responsible for the establishment of the need for calibration equipment and the general resources to provide for it.

Chairman ROTH. What role do you play with respect to the qualifications of potential contractors?

Mr. LORBER. I do not evaluate contractors.

Chairman ROTH. In any way?

Mr. LORBER. In my role as director of product assurance, I am responsible for the conduct of the inspection and test functions that we perform on contractor materiel. but I do not in any other sense evaluate contractors' performance

Chairman ROTH. I think we might as well establish who the other two witnesses are. Mr. Rivamonte, would you explain who you are and what your responsibilities are?

Mr. RIVAMONTE. Yes, sir.

I am currently a supervisor in the Systems Integration Division, U. S. Army TMDE Support Group. It is a position I have held for about 1 year now.

Prior to that time, I was a project engineer, doing metrology engineering for the calibration program.

Chairman ROTH. And Mr. Gonzalez, would you explain your responsibility?

Mr. GONZALEZ. Yes, since 1968, I have been the team leader for calibration automation at the White Sands Missile Range. I conducted the Julie test at White Sands under the direction of DARCOM.

Chairman ROTH. Mr. Lorber, if I may go back to your responsibilities. It has been your responsibility to determine whether or not the Army should procure automated technology, is that correct, or make recommendations to the appropriate authority?

Mr. LORBER. In that sense, Mr. Chairman, my responsibility is to be sure we have a proper and adequate calibration program and in that context, I have been interested in automation and have been involved early in the Army's effort with automated calibration equipment. I just distinguish between making a selection of a specific manufacturer or a specific piece of equipment. I have been interested and involved in automation, yes, sir.

Chairman ROTH. What has been your recommendation in this area?

Mr. LORBER. Sir, if I may go back, the Army initiated early experiments in automation in the midsixties. It was our intent to explore automation to determine whether automation would provide a good base for our calibration program.

In addition, we were interested in automation to determine what needs we would have to calibrate automated test gear. From that period on, we have watched the industry with automation, we have experimented with certain pieces of equipment for automation in various applications and based on that experience, we have moved into our current posture, sir.

Chairman ROTH. In April 1978, you assisted in the preparation of a letter from General Guthrie to the Office of Federal Procurement Policy, OMB, involving an unsoliciated proposal which JRL had submitted to the Army. In the summary sheet which bears your signature by which that letter was transmitted for signature to General Guthrie, you stated, and I quote:

> Our evaluation and final reply rejects Mr. Julie's 1976 proposal, is still valid and remains as our position today. Widespread automation of calibration repair is not in our best interest at this time.

Now, it is 1981, Mr. Lorber, and I am given to understand that there are at least some who believe automation is in the Army's best interests and could have resulted in substantial savings to the taxpayers. The letter signed by General Guthrie pursuant to your summary sheet references the unwillingness to consider the JRL automated system was in part the result of a review of industrial applications. Would one of these industrial applications have been the JRL automated system installed at Grumman Aerospace Corp.?

Mr. LORBER. Yes, sir.

Chairman ROTH. Did you specifically investigate that?

Mr. LORBER. Yes, I visited Grumman with Mr. Julie and members of my staff had visited Grumman and I am aware of other members of the Army having visited Grumman.

Chairman ROTH. What was Grumman's recommendation?

Mr. LORBER. Grumman was satisfied with their equipment and I saw no reason for them not to be satisfied with their equipment.

Chairman ROTH. Do you recall any of the other private industry users of JRL equipment that was reviewed by the Army?

Mr. LORBER. I believe that we reviewed several of their applications. There was contact with GE at one time, with General Dynamics and I believe there was some contact with Motorola, sir.

Chairman ROTH. What was the recommendation of General Electric, or conclusion?

Mr. LORBER. At the time we wrote that letter, I don't think they made a recommendation. They did not in any way negatively comment about it.

Chairman ROTH. You mention having contacted a Motorola facility in Texas. Have you personally ever discussed JRL's requipment with any Motorola employee?

Mr. LORBER. Not personally, sir.

Chairman ROTH. Did you direct Jack Vogt to call Motorola on April 6, 1978?

Mr. LORBER. A member of my staff did, yes.

Chairman ROTH. In view of his telephone conversation with Motorola——

Mr. LORBER. Yes, sir.

Chairman ROTH [continuing]. Did Mr. Vogt place that call to Motorola on April 6 so you would have additional justification to include in General Guthrie's letter to OMB?

Mr. LORBER. No, sir.

Chairman ROTH. The IG has concluded in his report that Mr. Julie has not been dealt with fairly; that he has not had full opportunity to participate in Government procurement of automatic equipment technology. It also states that one of the reasons is that the individuals concerned with these procurements were not happy with the aggressive marketing techniques used by the gentleman in question. Are you familiar with those findings?

Mr. LORBER. Sir, I have not seen the IG's report.

Chairman ROTH. Do you agree with these findings?

Mr. LORBER. I can only answer with respect to my own actions, sir. I have met with Mr. Julie a number of different times. I have discussed his equipment at great length with him. I understand the problems he has reported with respect to his dealings with some of the Army activities.

With respect to my own dealings with him, I have tried to be fair with respect to the evaluation. I have tried to discuss with Mr. Julie areas where his equipment within the Army would be appropriate.

As a result of some of that discussion and his analysis and discussion with other members of the Army staff, he was invited to visit several of our activities. I think, Mr. Chairman, you referred to a few of them, like Harry Diamond Laboratories and Aberdeen Proving Ground, the Electronics Command, then located at Fort Monmouth, where we personally believe there was sufficient workload to justify automation and asked Mr. Julie to demonstrate his equipment to those activities.

Chairman **Roth**. You say you tried to be fair to Mr. Julie. Why was JRL's equipment never actually tested by the Army until the 1981 White Sands test?

Mr. **Lorber**. Our early experiments that I mentioned were initiated in 1965. There were no equipments in the marketplace that were automated for calibration purposes in those days.

In those days, I think our early experiments started at Frankfurt Arsenal, since closed. We prototyped some equipment to determine whether we could automate. In those days, we were experimenting to see just how far we could go, the result of automation, and accuracy of automation, as well as the speeds.

Chairman **Roth**. It is my understanding that in 1973 or 1974 you purchased equipment from Fluke and from Hewlett-Packard on a sole source basis for purposes of testing, is that correct?

Mr. **Lorber**. Sir, I am not quite sure the method of procurement. I think you are talking about five pieces of equipment we procured. That was preceded by a study by the Army to determine locations where we could automate effectively. There was a request for proposal issued.

There were responses to the request for proposal and on the basis of the responses a procurement was made. That was the case Mr. Julie referred to earlier. He was declared unresponsive.

I cannot answer you directly as to whether it was a sole source.

Chairman **Roth**. But in any event, Mr. Julie was not given the opportunity?

Mr. **Lorber**. Sir, he was given the additional opportunity to respond. However, as he pointed out, the contracting officer ruled that he was not responsive.

Chairman **Roth**. Mr. Gonzalez, are you the one that was responsible for the White Sands test?

Mr. **Gonzalez**. That is correct. I conducted the test at White Sands Missile Range, N. Mex.

Chairman **Roth**. What is the result of your tests in White Sands?

Mr. **Gonzalez**. I found the Julie system in the White Sands type environment could be an effective automated calibration system.

Chairman **Roth**. Could you speak into your microphone so we could hear you?

Mr. **Gonzalez**. I said in the White Sands environment, the Julie system could be a cost-effective automated calibration system.

Chairman **Roth**. Did you study the matter from the standpoint of manpower, how long it took to train individuals to operate?

Mr. **Gonzalez**. Yes, sir, we did.

Chairman **Roth**. What were your findings there?

Mr. **Gonzalez**. Our findings are in our report and the time required to train a person to program the JR-106 was in the order of 3 working days. We trained an operator in approximately 3 hours, but that operator is an experienced manual calibrator. We have had no experience with somebody not experienced in calibration. So we cannot really substantiate the time and how long it would take somebody per se off the street to become an operator.

Chairman **Roth**. Would you recommend to DARCOM that Julie should be considered as a potential supplier of automated equipment?

Mr. **Gonzalez**. I think certainly Mr. Julie should be considered in any competitive procurement we may issue in the future.

Chairman **Roth**. Why was it necessary to ask the Air Force to make an independent study of JRL? Are you familiar with that?

Mr. **Gonzalez**. Yes, I am, sir. I don't know.

Chairman **Roth**. Does it make any sense to you?

Mr. **Gonzalez**. No, I thought our report was the fair test of the capability of Mr. Julie's system.

Chairman **Roth**. Does it sound like one arm doesn't know what the other arm is doing, or is there some deliberate reason for not utilizing your recommendation?

Mr. **Gonzalez**. I would not really care to comment in light of the fact I am not in a position to make those decisions and I am sure somebody else had some reason for it. I personally cannot see it.

Chairman **Roth**. Would you agree with the IG report that Mr. Julie has not been treated fairly, that it really took 7 years to get that kind of study made by White Sands, and in the meantime he was not given fair consideration in military procurement?

Mr. **Gonzalez**. As far as military procurement, those at DARCOM, I have no specific knowledge about those. White Sands did develop a specification and competitively procured Mr. Julie's system and I think under those guidelines, he was treated as fairly as anybody else from the White Sands standpoint in the purchase of the two systems we have.

And as far as the IG report, unfortunately we have not seen any part of it.

Chairman **Roth**. Mr. Rudman.

Senator **Rudman**. Thank you, Mr. Chairman.

Mr. Lorber, how long have you been in your present position?

Mr. **Lorber**. Sir, I have been in my present position since 1965. It has been augmented with other functions, but I have been the Director of Quality Assurance since 1965.

Senator **Rudman**. So you have a pretty good source of the history of this whole transaction?

Mr. **Lorber**. Yes, sir, from a Washington point of view, sir.

Senator **Rudman**. What I would like to do is kind of walk through some of the incidents and talk about fairness and objectivity and mistaken judgments. We all make mistakes in judgment. I don't think that is anything that anybody should be held accountable for unless they do it all the time and then they ought to be replaced. The question is, however, what is the difference between bad judgment and bad faith? So let's go through a few of these incidents that you were involved in and I would just like to hear your response.

First, it is my understanding that some years ago the Harry Diamond Labs gave a rather glowing report to DARCOM. Harry Diamond Labs evaluated this equipment, thought it was first-rate, thought it could be used, wrote to you and told you that and you simply wrote back to them and said you weren't interested in it at that time and yet that was addressed to a lab within the Army that certainly at that time was one of the greatest centers for knowledge in that particular area. Why did you do that, Mr. Lorber?

Mr. **Lorber**. Sir, as I recall that incident, as I explained earlier, Mr. Julie was invited to attend, to visit Harry Diamond Lab and demonstrate his equipment to the people you referred to. They did in fact indicate that the equipment would save money. The numbers they provided in their report indicated that there was a relatively small number of instruments that would be applicable to the Julie system.

They said it would serve an augmentation, they could increase the number and they were on the borderline for payoff. They were invited then to come in and solicit moneys for that equipment. They did not do so, sir.

Senator **Rudman**. Go on from there. Julie had made a proposal which you were asked to evaluate where they talk about the possibility of a graphics display with some of their equipment. It is my understanding that you specifically came back and listed four things about graphics displays and equipment that were negatives, as far as you were concerned. It is my understanding that those comments were really related to what the Army had tried back in 1972 and not to the Julie equipment which you were looking at at the time.

Mr. **Lorber**. At the time we were not criticizing Mr. Julie's equipment. We believe graphics would not provide the Army the benefits it needed.

Senator **Rudman**. Based on your prior experience?

Mr. **Lorber**. Graphics, not whether Mr. Julie's equipment worked or not worked.

Senator **Rudman**. And then, of course, Mr. Julie went to Moscow and came back and did not accept their order and had a meeting with General Guthrie and you attended that meeting, is that correct?

Mr. **Lorber**. Yes, sir.

Senator **Rudman**. And General Guthrie told him at that time you thought his equipment was good equipment, is that an accurate statement?

Mr. **Lorber**. Sir, I don't recall precisely General Guthrie's response. I have no reason to believe he would respond otherwise. I have never personally and I don't know if General Guthrie personally criticized Mr. Julie's equipment.

Senator **Rudman**. Mr. Julie was told at that time that the Army ability to buy calibrators was used up at that time, that there was no money available at that time, is that accurate or inaccurate?

Mr. **Lorber**. I do not recall General Guthrie making the statement we had used up our money.

Senator **Rudman**. At that particular time, there was a buy going out for 95 calibrators at a cost of roughly $12 million.

Mr. **Lorber**. Correct.

Senator **Rudman**. No one really sat down and made a determination that Mr. Julie's equipment, although automated, could provide those precise manual functions and do it in a more rapid fashion, is that an accurate statement?

Mr. **Lorber**. Sir, prior to the procurement of equipment, a determination was made that we were standardizing on the equipment that was being bought. That would have included a determination whether we wanted to change the character of calibration in the field. We did not evaluate Mr. Julie's equipment per se or anyone else's automated equipment per se.

Senator RUDMAN. It is not really accurate to say you didn't evaluate because under the Freedom of Information Act Mr. Julie did, in fact, get hold of a copy of a 16-page report on his equipment. You recall that equipment, don't you?

Mr. LORBER. That I sent him?

Senator RUDMAN. Whether you sent it to him or not, he got hold of it. There was a report done by DARCOM to General Guthrie.

Mr. LORBER. If it was done by DARCOM, then I am responsible for it.

Senator RUDMAN. In that report, there was one whole area devoted to a really tough attack on the Julie equipment by an employee of the Motorola Corp. Do you recall that?

Mr. LORBER. I recall the attack by Motorola, or the response by Motorola on the equipment, yes, sir.

Senator RUDMAN. But you also knew, and you correct me if I am wrong, that the general response of Motorola to that equipment was excellent and this particular response was singled out and isolated from one employee new to the equipment and it was his statement selected to be used as being representative of Motorola. Is that true or is that false?

Mr. LORBER. I recall at that time the Chief of the Calibration Laboratory made those comments, not an individual.

Senator RUDMAN. I would like you to go back and look at your records. I think you will find that is incorrect.

Mr. LORBER. I will go back but I did look at the records a few days ago, sir. The individual was the Chief of the laboratories that made those comments.

Senator RUDMAN. But the comments themselves are directed toward an inexperienced operator who operated this versus an operator who had been operating this and received adequate training. Is that true or not true?

Mr. LORBER. All I can recall, sir, the information I received is from the manager of the laboratory. I do not know the basis on which he made that determination.

Senator RUDMAN. Would it be fair to say when Mr. Julie first came with this equipment in 1974 that it promised so much beyond what current technology then promised that it was somewhat of a natural reaction to assume that part of this was just pure marketing puffery? That would not be an unreasonable conclusion. Would that be a fair statement as to where some of this problem started?

Mr. LORBER. Senator Rudman, if I can state my own personal feelings at that time, Mr. Julie contacted me after his experiences with the previous procurement we talked about. He made his statements to me, demonstrated his equipment. At that time, we provided him an opportunity to present the proposal which you referred to before. My attitude was we should evaluate his program.

Senator RUDMAN. Do you think that up until today, other than the White Sands experience which Mr. Gonzalez testified to, Mr. Julie's equipment has received a fair test by the U.S. Army.

Mr. **Lorber**. The Army had not tested his equipment until White Sands procured it. All evaluations were made on the basis of observation of equipment in the hands of contractors or his data furnished to us.

Senator **Rudman**. Just a few more questions, Mr. Lorber and I would like you to be very frank.

How did you find Mr. Julie to deal with?

Mr. **Lorber**. Frankly from where I sit, I have had no difficulty dealing with Mr. Julie. I understand where he is coming from and he understands where I am coming from. I have no problem at all. All I am concerned about is the equipment.

Senator **Rudman**. You didn't find his continued approaches irritating?

Mr. **Lorber**. Personally, no.

Senator **Rudman**. You didn't find your characterization in this comic book irritating?

Mr. **Lorber**. I would be lying if I said I enjoyed it. However, from where I sit, I have been characterized in many different fashions.

Senator **Rudman**. Is it fair for me to state, and I don't state this critically, I state this as a matter of general observation, that there does exist between DARCOM and Mr. Julie, shall we say politically, somewhat of a tense atmosphere?

Mr. **Lorber**. You may characterize it as tense——

Senator **Rudman**. You would not characterize it as tense?

Mr. **Lorber**. My personal view?

Senator **Rudman**. Your personal view.

Mr. **Lorber**. My personal view, there are indications of it, yes. But I am not tense.

Senator **Rudman**. Are you satisfied looking at the record of DARCOM and this entire transaction that DARCOM treated Mr. Julie fairly and equitably and gave him the same kind of consideration that a major U.S. corporation well connected in this city would have received?

Mr. **Lorber**. Sir, I am not a procurement expert. I can only speak in retrospect that we could have evaluated his equipment in a much more competitive atmosphere.

Senator **Rudman**. You could have evaluated his equipment in a much more friendly fashion?

Mr. **Lorber**. Yes.

Senator **Rudman**. Mr. Lorber, let me say to you I don't impute malice or bad faith because I don't have proof of that. But I do say I don't think DARCOM was performing in the highest standards of the U.S. Army in this transaction and I certainly hope everyone has learned something from this because I don't believe Loebe Julie was treated very fairly.

Were I in his position, I would be as upset or more upset than he has been and I think he is entitled to fair treatment, no more, no less, but fair treatment.

Chairman **Roth**. I would like to ask you several more questions: One, how important, as a matter of policy, do you think it is to attempt to develop second or third sources?

Mr. **Lorber**. Mr. Chairman, I share your concern. I think it is important.

Chairman **Roth**. Why wasn't Julie then looked upon as a potential additional source beyond Fluke and Hewlett-Packard?

Mr. **Lorber**. Mr. Chairman, we buy our calibration equipment, because it is manual, from many sources. I believe Mr. Julie is referring to the uniqueness of automation.

Chairman **Roth**. That is correct.

Mr. **Lorber**. We have not procured that many automated equipments.

Chairman **Roth**. Do you think your office, which is responsible for materiel development, has aggressively sought the latest technology in this area or would you today modify your earlier position with respect to manual calibration?

Mr. **Lorber**. Mr. Chairman, to answer your first question on aggressively following automation, the Army was very interested and initiated substantial programs in the early 1960's for automation. We experimented with it. We evaluated the equipment at that time. We have watched the marketplace and it is our belief that, in the current evolution of technology for calibration and test equipment, the marketplace will provide substantive automation for use.

Chairman **Roth**. I would just point out that 7 or 8 years ago the National Bureau of Standards recommended that the Army and military services look into automation at that time.

We find, frankly, in 1981, that no one really knows what the calibration needs are. If I understood the Secretary, that is a first order of business. Has your organization really discharged its responsibilities?

Mr. **Lorber**. Currently, I am responsible for the calibration and would be performing that function. As indicated in the statement, there are going to be some organizational changes.

Chairman **Roth**. I would like to join in Senator Rudman's comments. I, too, am very concerned with the treatment of Mr. Julie. It seems to me your organization, which I believe has primary responsibility for aggressively seeking new and better technology has failed in its task. I think this is going to have to be the first order of business with the new Secretary. Time is running late and I thank you, gentlemen, for being here.

[Responses to written questions submitted by Senator Roth follow:]

Responses of Mr. Lorber to Written Questions Submitted by Senator Roth

Question 1. Did either the Inspector General or the Air Force inquiry test a Julie LOCOST 106 in a mobile van under conditions that would actually be encouraged by the field Army? If not, why not? (a) Can the Julie LOCOST work in the mobile van set? (b) Why hasn't the Army ever field tested automated equipment in vans?

Answer. Copies of the Army Inspector General Report and the results of the Air Force inquiry referred to have not been furnished to me. Therefore, I cannot respond to this question.

Question 2. Does the Army have any short-term or long-term plans to buy automated calibration equipment similar to Julie's? (a) If the Army cannot use effectively automated calibration equipment in mobile vans, why have they purchased MECCA automated meter calibrators? (b) Why did the Army split up a single requirment for 18 MECCA automated meter calibrators into a series of 5 separate procurement actions? (c) Has DOD approved the MECCA as the standard meter calibrator for all three services? (d) To what extent has standardization of calibration equipment been achieved within the three military services?

Answer. This question is a continuation of one raised during my earlier testimony and therefore my response follows information I furnished at that time. The Army's interest in automation of calibration activities was a natural result of a continued interest in improving productivity and assuring availability of calibration standards and techniques to meet the need of emerging new systems. Early work to explore automation of electronic type calibration operations occurred during the early sixties. The need for these studies was to establish methods to calibrate automatic test equipment, to develop self calibration capabilities for automatic test equipment and to improve calibration productivity. At that time, automation usually resulted in large assemblages of equipment. These experiments provided useful information. The application of the variety of calibration equipment available depends on the environment in which the work is performed, the magnitude and variety of calibration required, calibration operators utilized and the mix of calibration, adjustment and repair work involved. The Army has a wide variety of field activities where test, measurement and diagnostic equipment (TMDE) is employed and requires support. These activities vary from very large industrial type operations to relatively small isolated and mobile military units.

To man and equip these activities, different types of equipment are employed. Large industrial type activities, such as our Laboratories, Proving Grounds, Arsenals and Depots are equipped with a variety of calibration equipment selected to support their unique workload. Automatic calibration standards, as well as other calibration equipment at these activities, are determined by the local activity based on both need and economics.

Calibration and repair equipment for the military field units are selected to meet the military field needs established for military maintenance support activities and to provide the military technician with standard tools and procedures regardless of location. Based on the wide disparity between industrial type activities and the military units the equipment needs of each type are expected to be different. Industrial type activities are authorized greater flexibility in selecting equipment for calibration and repair of TMDE. The military units for calibration and repair are equipped with military standard sets to support the workload at their given locations.

(a) In response to 2a. The Army concluded that large automatic calibration equipment was not suitable for the mobile van application. The variety of instruments to be calibrated and repaired by mobile vans was not a suitable workload to support automation. Furthermore, the use of automatic calibration did not eliminate the manual small calibrators as they were requred for TMDE not serviced by the automatic calibration devices and for the repair of TMDE. The MECCA meter calibrator is a small instrument not much larger than the manual equipment it replaces. The MECCA is classified as a "smart' instrument in that it has a micro processor that allows the use of simple programs and speeds up the calibration procedures. Initial investment cost of MECCA is substantially less than the use of large automated calibration sets. Further, MECCA was designed to be portable.

(b) In response to question 2b, I previously informed the Committee that I was not involved in the procurement operation in any direct way; therefore, I do not have information to respond.

(c) In response to question 2c, the MECCA meter calibrator is a Navy standard instrument. It is also available as a commercial item which has been procured by many industrial manufacturers. Federal Standardization Policies require consideration of available instruments in lieu of separate development efforts wherever possible.

(d) With respect to question 2d, all three military services cooperate and exchange technical information about calibration equipment and procedures. All services train their military calibration specialists at the same military school, Lowry Air Force Base. Calibration equipment of the three services differ due to the unique needs of each service and the calibration equipment used is generally standard, commercially available equipment that is procured competitively.

Question 3. The Army recently reorganized to combine the calibration and repair operations under one organization, established fixed calibration and repair activities in the United States and purchased manual calibration equipment for these activities. Before buying this equipment, did the Army assess, on a location-by-location basis, the feasibility of using automated calibration equipment? If not, why?

Answer. The decision to combine all calibration and reapair of TMDE was the result of a very extensive and detailed study conducted by the appropriate elements of the Army and involving all affected Army activities. All facets of calibration and repair were taken into consideration with emphasis placed on improving the readiness of Army TMDE and providing a capability of servicing the new test equipment expected to be fielded in the near future. Our initial efforts focused on the Army in the field where it was necessary to establish a capability of servicing a wide variety of TMDE at many locations. These services included calibration, adjustment and repair that was to be accomplished by military technicians.

The Army commercial type TMDE support activities are to be considered during the last phase of our conversion program. It is expected that during this last phase detailed studies will be undertaken to improve productivity. These locations will have sufficient workload requiring special calibration equipment to improve productivity. This is consistent with previous efforts to improve productivity by automation.

Question 4. The Army had several reports completed since 1973 assessing the effectiveness of the JRL equipment. In fact, a report on the JRL system completed this year by the White Sands Missile Range (WSMR) very favorably reviewed the JRL equipment. As a technical specialist in this area, do you believe that after all those studies there is not enough information on which to judge the JRL equipment?

Answer. In response to question 4, I have received only one report assessing JRL equipment which was prepared at my request. When WSMR procured two JRL LOCOST 106s at a result of a competitive procurement, I requested WSMR to conduct an evaluation test to compare LOCOST 106 performance against equivalent manual calibration operations. In addition to this specific report, I have received several commentaries about JRL LOCOST 106 from Mr. Julie and from Grumman Corporation. The WSMR reported that JRL LOCOST was three times faster than manual calibration, that manual equipment was used to repair TMDE and used for servicing remote locations and indicated JRL LOCOST was suitable for applications similar to WSMR. With respect to these findings, the record shows that Mr. Julie was invited to visit several Army activities similar to WSMR where the calibration workload was large and could benefit from automation. As a result of this invitation, Mr. Julie and others from JRL visited Aberdeen Proving Ground, Harry Diamond Laboratories, Fort Monmouth, Picatinny Arsenal and Tobyhanna Army Depot to demonstrate his equipment. These activities have the authority to procure such equipment. All installations indicated JRL equipment performed as advertised, however, the quantity of TMDE that would be calibrated by the JRL equipment was not large enough to justify the investment. The following extracts from the internal TECOM (APG) evaluation of JRL LOCOST system dated March 22, 1978, prepared by CW4 Robert D. Reib, TECOM Calibration Coordinator, is typical of each of the evaluations of installations reviewing LOCOST 106 for their own internal applications.

CONCLUSIONS

(a) Automated calibration systems can save money.

(b) TECOM automated calibration system should be limited to those that are simple to program (typically less than ½ hour) for each new calibration procedure.

(c) Automated calibration systems will not significantly reduce the skill levels needed at the AICFs. They will reduce the number of personnel required.

(d) The JRL LOCOST system is more economical for automated support of meters than either the HP 9213c or JF 7505/7510 and should be purchased in lieu of either; if equipment densities warrant such a large investment.

(e) Current automated systems should only be considered for EPG, APG, and WSMR at the present due to ITE densities.

(f) Approximately 1500 annual calibrations (excluding simple common multimeters) are necessary to justify the JRL LOCOST system.

(g) Approximately 400 annual calibration (excluding common multi-meters) are necessary to justify the JF 5101A system.

(h) Purchasing a JRL LOCOST system for either WSMR or EGP is not presently warranted since they have operating automated systems already paid for and programmed which should be good for another five years.

(i) Purchasing a JF 5101A may be warranted at APG."

Responses from other Army activities that JRL representatives visited and demonstrated JRL LOCOST automatic calibration were similar to the above review by TECOM.

The one report from WSMR released this year, confirms the many earlier internal evaluations made by various Army activities during 1978 time period that large scale automation requires substantial workload. Only a small number of Army (industrial type) activities have sufficient quantities of calibration workload to justify large investments for automation.

Question 5. Have you ever received any compensation, gift or gratuity from any of the suppliers of calibration equipment in excess or in conflict with law or Army rules and regulations?

Answer. I have not received any compensation, gifts or gratuities from any suppliers of calibration equipment.

Question 6. Isn't it true that some of the specifications in a 1974 RFP were based on the characteristics of Hewlett-Packard equipment? If this is true, how could a company like Julie have hoped to meet the Army's specifications since his equipment is very different from those of many of his competitors? Why were some of the "specs" for the RFP based on Hewlett-Packard equipment? Was it "state-of-the-art"?

Answer. This question refers to specifications in a 1974 RFP without further description. Many RFPs are released during a year. Furthermore, my office is not required and does not review RFPs or specifications for calibration equipment. Therefore, I cannot respond further to this question.

Question 7. Did you ever make unfavorable recommendations to any Army personnel, from 1973 to the present, concerning the JRL equipment? Did you ever make favorable recommendations to any Army personnel from 1973 to present, concerning the Fluke or Hewlett-Packard equipment which the Army has bought on occasion?

Answer. To the best of my knowledge, my official actions concerning JRL equipment that may be considered as unfavorable were limited to the return of the first JRL unsolicited proposal, discussions concerning the second JRL unsolicited proposal and reports to my superiors concerning those actions. These evaluations were essentially limited to the need of the Army for such equipment and not specifically to the advertised performance of the equipment. As I have already stated, I referred Mr. Julie and his representatives to several Army activities to demonstrate JRL LOCOST 106 and advised these installations that Mr. Julie was to receive an objective and fair reception. Furthermore, I encouraged Mr. Julie to submit the unsolicited proposals as he represented his equipment to be unique and that it offered many advantages not available with other equipment. In addition, I arranged for Mr. Julie to visit the Army Product Manager for Automatic Test Support Systems to learn about opportunities to bid on upcoming test equipment procurements. While these procurements are not for calibration equipment they are similar type devices that can be manufactured by firms with JRL capabilities. My personal knowledge of JRL equipment is limited to devices Mr. Julie demonstrated and the Grumman operation. My comment, therefore, on such observations has been limited essentially to "it performs as advertised."

With respect to the second part of this question, it would be impossible for any active Product Assurance Manager not to have commented on Hewlett-Packard or Fluke equipment over a period of eight years. Hewlett-Packard and Fluke manufacture a wide range of test equipment standards, computers, calculators and a variety of support equipment. I have been issued and use extensively a Hewlett-Packard 65 hand held calculator and have used a desk type Hewlett-Packard calculator. The technical literature contains innumerable articles and references to Hewlett-Packard and Fluke test equipment as well as other large and small manufacturers of test equipment. Therefore, it would be most difficult to perform my duties as Director of Product Assurance and Test without, at some time, discussing the merits or problems with specific types of test equipment including Hewlett-Packard and Fluke instruments.

JRL equipment is not as widely employed and therefore very few opportunities occur to discuss such applications. In this regard, I believe that of the 12 LOCOST 106s that have been employed by industry, the Army procured two at WSMR. I have observed and discussed the LOCOST 106 with WSMR personnel.

Question 8. Did you ever tell anyone, in the Army or elsewhere, at any time since 1973, that JRL equipment was ineffective or not as good as claimed? Did you specifically recommend against purchasing the JRL equipment?

Answer. With respect to this question, I recently approved and distributed a report prepared by WSMR that stated JRL LOCOST was three times faster than manual calibration. This report is in conflict with several JRL claims that JRL LOCOST 106 is seven times faster than manual calibration. I returned one JRL unsolicited proposal stating that the Army did not have a need for such equipment. My advice to Army activities concerning the purchase of all types of calibration equipment is to comply fully with the Defense Acquisition Regulations.

Responses of Mr. Gonzalez to Written Questions Submitted by Senator Roth

Question 1. Even with the White Sands report, the Army still has no idea how cost-effective the JRL equipment is. Doesn't the White Sands report provide good economic analyses showing the superiority of the JRL system?

Answer. Yes. The economic analyses contained in the White Sands Missile Range (WSMR) report, show the JRL LOCOST 106 can be cost-effective when operated in the WSMR or a WSMR type environment. The economic analyses were prepared in accordance with Army Regulation 11-28 and were validated by the WSMR Comptroller.

Question 2. You testified that your testing of JRL equipment involved using an experienced manual calibrator operator. Can you speculate on the use of non-experienced personnel?

Answer. In my opinion, if the JRL LOCOST 106 were used as a sorting tool (i.e., good or bad), then a non-experienced person could be trained to be a calibrator operator in perhaps two to three weeks.

Question 3. Do you have any personal knowledge as to why JRL equipment was not purchased by the Army anywhere else other than WSMR?

Answer. No.

Question 4. Please elaborate on your findings that JRL equipment was: (1) more economical; (2) easier to program; (3) quicker; or (4) better overall than the other equipment tested?

Answer. (1) The tests at WSMR were not conducted in parallel, but were comparisons of current manual and past performance of automated calibration systems used at WSMR. The summary of economic analyses shows that the JRL LOCOST 106 would annually save $46,000 vs manual, $112,000 vs Hewlett-Packard 9213C, $38,000 vs Fluke Lacs. (Ref: WSMR Report, Julie Research Laboratories (JRL), LOCOST 106 Automated Calibration System Evaluation, by H. F. Gonzalez, July 29, 1981, Page 7, Figure 5.)

(2) The test conducted at WSMR showed the JRL LOCOST 106 to calibrate three times faster than the current manual method and two times faster than automated calibration systems previously used at WSMR.

(3) Preparation of calibration programs for the JRL LOCOST 106 does not require a computer programmer skilled in a high level language (i.e., Basic, Fortran). The programmer, however, needs to be an experienced calibrator possessing specific knowledge of the particular equipment for which a program is being prepared.

(4) The JRL LOCOST 106 possesses better overall accuracy specifications than automated calibration systems previously used at WSMR.

Question 5. Will the Julie equipment better fulfill Army needs, in your opinion, than manual equipment or other currently available automated calibrators?

Answer. In my opinion, the JRL LOCOST 106 could fulfill the Army's needs better than manual equipment or other currently available automated calibration systems if sufficient workload exists and conditions warrant, e.g., quantity, workload mix, complexity and conditions such as logistics and environment.

Responses of Mr. Rivamonte to Written Questions Submitted by Senator Roth

Question 1. What is the AN/MSM-105(V)1? If the field Army can't use Julie's calibrators because they are automated, why are they buying the AN/MSM-105 which is automated?

Answer. I should point out that the US Army TMDE Support Group (USATSG) at MICOM for which I work has no direct responsibility for the hardware development of the AN/MSM 105(V) 1, however, because the USATSG will provide calibration and repair support of the general purpose TMDE in this system, I can respond based on knowledge gained from this involvement. The AN/MSM 105 was developed by CECOM, Fort Monmouth, NJ, To perform fault diagnostics, isolation and repair a specific population of some 50 or 60 current and future Army Special Purpose Weapons and Communications Systems.

Though automated and vehicular mounted to satisfy filed mobility and mobilization requirements, the AN/MSM 105 is not designed to be a calibrator. It does not provide the broad range of capability necessary to provide calibration and repair support of General Purpose TMDE. Though I am not familiar with the economic factor and considerations relative to this system, I do recognize that the AN/MSM 105 was designed to utilize very sophisticated diagnostic software in a field environment to do tests of complex digital equipment that cannot be tested manually.

To respond to the second part of your questions, the MICOM response to JRL 1979 unsolicited proposal did not state that "the field Army can't use Julie's calibrators because they are automated." Quite the contrary, the MICOM evaluation of the 1979 proposal recognizes the power of automation and alluded specifically to the automated meter calibration portion of the Navy MECCA System as the apprently economically superior alternative to the JRL LOCOST 106. the MECCA meter calibrator sells for 1/5 the cost of the LOCOST 106 sold to White Sands Missile Range (WSMR) and requires only a fraction of the rack space. It is my understanding that JRL has sold 17 LOCOST 106's since its introduction in the mid 1970's. The WSMR contract was used because it represented the only hard evidence available on cost in 1979. Procurement at $154,000 was introduced to the evaluation to make more competitive the JRL lease proposal, which from what I understand today, ranges from $300,000 to $900,000 per system per 10 year life cycle.

Question 2. What is your responsibility in the procurement of Army calibration equipment?

Answer. In my position as Chief of the Systems Integration Division at USATSG, I supervise the planning, product improvement and system engineering efforts related to measurement standards and TMDE Calibration and Repair sets for the field Army. Fully staffed, I have 7 engineers and 3 technicians working for me. My immediate supervisor is Mr. F. B. Seeley, Chief of the Metrology and Laboratory Directorate of USATSG. I have 17 years of working engineering experience in Army Metrology and Calibration. My division reviews all new TMDE calibration and repair requirements, develops support systems and specifications and provides metrology-related technical expertise to MICOM contracting and procurement personnel.

Question 3. In any of the evaluations or critiques of JRL equipment that you were involved in, did you have any assistance from any representatives of Julie's competitors? If so, who? What was their role?

Answer. To the first part of your question the answer is no, the other two parts are not applicable.

Question 4. You participated in a team which in 1980 disputed JRL's cost savings figures. How did you come up with your figures to dispute these findings? In light of Mr. Ambrose's testimony before the Committee that there is no adequate data base from which to make acceptable cost savings analyses due to the fact that this data base involves at least 750,000 instruments and over 1,200,000 calibration and or maintenance actions per year worldwide, how can you dispute the Julie figures? Please provide the Committee with your 1980 analysis and explanation.

Answer. To put my role in perspective, it should be understood that prior to the October 1979 unsolicited proposal, I had no involvement in JRL related matters except to attend a hardware demonstration in 1975 at Motorola with Col. Walsh, who was then the Director of the Calibration Center. I was selected to evaluate the October 1979 proposal because I had not been previously involved in JRL related controversies, but had since 1973 extensive hands-on experience in automated calibration systems.

The data used in the MICOM evaluation came basically from the worldwide Army Concept study to improve TMDE calibration and repair. This study represented 2 years of work by a team from USATSG and at the time represented the most comprehensive assessment of the eminent new mission for total-world-wide TMDE calibration and repair. I believe that JRL also used this study in the preparation of their proposal. MICOM training costs were obtained from the Tri Service School at Lowry Air Force Base and hardware costs against a LOCOST 106 and then against a recognized alternative, the automated meter calibration portion of the Navy MECCA program. A copy of that evaluation with transmitting correspondence is provided.

Since I am not familiar with what Mr. Ambrose considers a shortcoming of the data base, I cannot comment on his assessment of the valuation. Certainly he is seeing the Army TMDE Calibration and Repair program in terms of the current phase of implementation of the DA Concept for improved TMDE calibration and repair and is now in a position to view the program with information not available 2 years ago. When the evaluation was performed in 1979, I made an honest sincere effort to accurately project the LOCOST 106 and an alternative automated system into a realistic Army scenario. By using common workload, manpower and associated factors, the evaluation reduced to a comparision of two automated systems nearly independent of the data base. Significant changes in the basic parameters would not alter the relative ranking of one automated system to the other. The resulting choice of system was then an assessment of the economical trade offs of capability versus cost as a function of through put and the associated payback.

Question 5. Army claims that the JRL equipment won't meet the Army's field needs. Is the JRL system adaptable to field needs in your opinion? (a) Is it mobile equipment? (b) How does it compare in size to its competitors? Would it take up less room in a mobile van than say Fluke or Hewlett-Packard?

Answer. I should point out that, in the 1979 evaluation, it was assumed that the JRL system was adaptable to field needs, that it was usable in the environment of a mobile team on the road and that it would be possible to fit it into the space available in a AN/GSM 286 or AN/GSM 287. Since I know of no one who has environmentally qualified the LOCOST 106, I cannot assess the validity of these assumptions.

As to how the JRL system compares in size with competitors, the JRL system sold to WSMR is roughly the same size as a comparable system of the mid 1970's and nearly 3 times larger than the MECCA unit. Hewlett-Packard no longer makes automated calibration systems of this general type.

Question 6. Would you today rely on all the assessments and data you have provided concerning JRL equipment? Do you feel you presented your superiors with accurate and complete information? The IG report states that information provided to GAO, Congress and Army headquarters contained inaccurate, unproven and inconsistent information. I understand that you and Mr. Fred Seeley were personally responsible for many of the technical assessments and evaluations of the Julie equipment. It appears that the IG report concludes that you were one such part who provided such inaccurate, unproven and inconsistent information. Do you care to comment?

The IG report states that there was no attempt by AMCC/ATSG to resolve questionable issues and cost factors relating to JRL equipment. Please comment.

Answer. The data and assessments I compiled and provided represented what I considered to be the most current and accurate information available at the time of the response. The data came from many sources within USATSG, as it impacted many areas of the calibration program. Since my involvement spans 2 years, I would certainly not rely on 1979 correspondence to respond to the same questions today. I do, however, sincerely believe that I presented my superiors with as accurate and complete an assessment as was available. As I have not had a chance to see the final IG report, I cannot comment on the conclusion of the report, however, I must reiterate that I personally made every attempt to professionally represent USATSG in all JRL related matters. As to your questions concerning the resolution of questionable issues and cost factors, it was, and is, my understanding that in the evaluation of an unsolicited proposal, it is improper and illegal to negotiate for alternative quantities, cost or hardware configurations.

Chairman **Roth.** We have two more witnesses that we would like to call. Mr. Charles Weber and Mr. Robert Reib.

Gentlemen, will you please raise your right hand.

Do you solemnly swear to tell the truth, the whole truth and nothing but the truth, so help you God?

Mr. **Weber.** I do.

Mr. **Reib.** I do.

TESTIMONY OF CHARLES WEBER, ENGINEERING SUPERVISOR, GRUMMAN AEROSPACE CORP., AND ROBERT REIB, NATIONAL SERVICE MANAGER, EIL INSTRUMENTS

Chairman **Roth.** Do either one of you gentlemen have a prepared statement you would like to make?

Mr. **Weber.** No.

Mr. **Reib.** No, sir.

Chairman **Roth.** Mr. Reib, there has been a number of unconfirmed reports that the Army calibration program is in serious disarray. Some reports allege that calibration equipment has been cannibalized, that equipment is no longer calibrated as often as it should and that calibration techniques must work overtime to handle the excessive overload of equipment needing calibration.

Did the Army know about these problems?

Why did the Army just recently send a special team over to Europe to investigate these problems, and doesn't the existence of these problems make the need for equipment like Mr. Julie's all the more apparent?

Mr. REIB. Sir, I had the unique opportunity about 6 months ago to go to Europe to bid on a contract and while I was there, I discussed calibration with the technicians who were there. They clearly indicated to me from the highest level down to the lowest level of technician that there was a serious manpower shortage.

They were drastically behind in their workload, the equipment was not being calibrated, the technicians were working excessive hours.

As a matter of fact, one day I was there, one of the technicians made a point of telling me, that here it was almost 5 o'clock on Saturday afternoon and he didn't know if he was working the next day or not. They didn't know if they were going to work a 6- or 7-day week that particular week.

Chairman ROTH. So it is an accurate description to say the Army's calibration program is in disarray?

Mr. REIB. I certainly cannot speak for the entire program. I can tell you for a fact what I observed in Europe 6 months ago would indicate there were serious problems in manpower shortage.

Chairman ROTH. The Army has consistently claimed it needs mobile equipment and that JRL equipment won't fit these needs.

What do they mean by mobile?

Does this mean vans will be driving right up to the foxhole and calibrating gear?

How large is the average piece of equipment that needs to be calibrated?

Mr. REIB. When the Army is talking about mobile calibration, they are talking about a 5-ton, or 2½-ton truck driving down the road going from perhaps one maintenance area to another maintenance area. There should be no misunderstanding that they are literally going from foxhole to foxhole. This is obviously ridiculous.

I, for one, questioned the need for mobility in the calibration program for a number of years and quite frankly don't feel it is all that justified. Certainly there will be some items that will be too large or too complicated to be disassembled and moved to a central location.

The vast majority of the equipment is small, can easily be picked up by an individual and can be brought to the calibration activity.

Chairman ROTH. I believe you are the author of a March 22, 1978, report entitled the "Reib Report."

Do you recall this study?

Mr. REIB. I did write a report sometime in early 1978 while I was in the Army at Headquarters TECOM. That is probably the one you are referring to.

Chairman ROTH. I think for purposes of the record, it should be pointed out you are no longer in the Army?

Mr. REIB. I retired in November 1978.

Chairman ROTH. What do you do now?

Mr. REIB. I am with a civilian company performing calibration for civilian firms.

Chairman ROTH. Could you summarize what this March 22 report was all about and what you found with respect to equipment furnished by Julie Laboratories?

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Mr. **Reib**. I was directed by the then commander of TECOM [Test and Evaluation Command] to do an onsite impartial survey of the Julie automated system in response to some of his forceful salesmanship that the Army had experienced and to bring back an objective evaluation of what his equipment would do as compared to some of the other automated systems.

This came about because I had been in the unique position of having worked with the other automated systems that the Army had already procured and they felt I had a little bit of ability in that area.

My report in essence said Mr. Julie's equipment did exactly what it was advertised to do. It was, in fact, more efficient, easier to program, programing being the most significant factor. In retrospect, it appeared we may have purchased the wrong program.

Chairman **Roth**. In other words, according to your findings, Julie Laboratories did have a role to play in the military calibration program?

Mr. **Reib**. Absolutely, no question about it.

Chairman **Roth**. Do you find it contradictory that a month later at the investigation of DARCOM that a recommendation was made by DARCOM that automatic calibration had no role with respect to the Army? Did that make sense to you?

Mr. **Reib**. That makes absolutely no sense.

Chairman **Roth**. You agree basically with the findings of the IG that, or perhaps to go even further, that Mr. Julie had not been treated fairly and had not had the opportunity to participate in procurement.

Do you think the reason the IG report gives is correct, and that is because of his aggressive marketing technique?

Mr. **Reib**. I don't want to judge other people's attitudes. I personally—I want to set the record straight, I did work for Mr. Julie for about 6 months subsequent to my retirement.

In that capacity with him, I went to the Army Metrology and Calibration Center and made a presentation of a report, an unsolicited proposal and came away after only 2 hours—this was the first time I ever experienced Mr. Julie in relation to the Army—with a very negative attitude.

As a matter of fact, I made a statement to him, something to the effect that he couldn't sell the Army anything at this point; he was wasting his time.

Yes, there was definitely a hostile attitude toward him.

Chairman **Roth**. Do you think that attitude can be changed?

I have heard that even now the Army will never do business with Mr. Julie?

Mr. **Reib**. We would all like to believe it could be changed. As an individual, I am sorry, I don't believe you could change it.

Chairman **Roth**. Mr. Weber, would you tell us who you are and what your role in this area has been?

Mr. **Weber**. First, for the record, I would like to correct the spelling of my name. It is one "B" and my children would never forgive me.

I am the engineering supervisor of Grumman Aerospace Corp. for the Measurement Standard Labratory. I have worked for this laboratory for 16 years. I have got 23 years of experience in this metrology field and I have known Mr. Julie for 19 of those.

My role in this affair of the automatic calibration systems really goes back to 1975 when our laboratory was faced with a shortage of trained technicians and an increasing workload of very complex equipment and a very large workload.

At this time, we started looking into the area of automated calibration systems. I personally visited a Hewlett-Packard facility in New Jersey and saw an automated Hewlett-Packard system.

John Fluke, Jr., son of the president of, or the founder of John Fluke, brought a Fluke Terminal 10 system into our facility and set it up and demonstrated it for us that day. Then my supervisor and I, went to Julie Research and we evaluated his system there. We subsequently devised a specification of our needs, put it out for competitive bid.

Hewlett-Packard, Fluke, and Julie were asked to submit bids. Hewlett-Packard at that time was just discontinuing their effort in this field. So we received two bids. We accepted the Julie Research bid and had it installed and have been using it ever since.

Chairman ROTH. In your opinion, is there any other product on the market that can do as much or better than Julie equipment?

Mr. WEBER. At the present time I would say no, there is not.

Chairman ROTH. There is not. Were you present when Army personnel came to your laboratories to observe the Julie equipment in operation?

What was their impression?

Mr. WEBER. There were a number of visits. Yes, I was present really at all of them. My impression was that they appreciated the system and that they were favorably impressed. That was my opinion.

Chairman ROTH. In view of those findings, as well as others, why do you think it has taken the Army so long to determine the effectiveness of the Julie equipment?

Mr. WEBER, I really wouldn't know, sir.

Chairman ROTH. And finally, the Army claims that the JRL equipment won't meet the Army's field needs.

In your opinion, is the JRL system adaptable to field needs?

How does it compare in size to its competitor?

Mr. WEBER. Well, it is certainly no bigger, actually it is smaller than the systems that were competitive at that time. We are talking 1976. There have been some changes in the field now. So probably the comparative size would be almost the same. It is certainly much, much smaller than the manual systems that they have acquired.

Chairman ROTH. Senator Rudman?

Senator RUDMAN. Mr. Weber, the bottom line of your statement is that Julie equipment, was, as of that time, state-of-the-art equipment as far as you know, and this is your field for one of the major U.S. aerospace corporations?

Mr. WEBER. That is correct.

Senator RUDMAN. And you know of nothing else in the field that is superior to it?

Mr. WEBER. To my knowledge, there is none.

Senator **Rudman**. You don't know anything else that is equal to it?

Mr. **Weber**. In my opinion, I would say there is not.

Senator **Rudman**. How about cost? Is Julie's equipment competitive with other equipment in the field?

Mr. **Weber**. I would say costwise, they are quite competitive.

Senator **Rudman**. Tell me, Mr. Weber, how long did it take you, in your position, to decide to buy a piece of equipment from the time you thought you wanted automated equipment to the time you made a decision to buy it? How long did that take?

Mr. **Weber**. Well, we were evaluating automation for several years in the electronic area. Several years before that, we had automated successfully in other measurement areas. But we had never found anything that was suitable up until late 1975 when we saw those competitive systems on the market. So you could say we decided within 2 to 3 years that we did need automation and within a year, I would say, we evaluated the systems that were available and decided on which ones to buy.

Senator **Rudman**. You made that decision and made that recommendation to your superior?

Mr. **Weber**. Yes. It was not completely my decision because there were several others in my department involved in this; yes.

Senator **Rudman**. One final question, Mr. Weber.

Have you been here for this entire hearing this morning?

Mr. **Weber**. Yes, I have.

Senator **Rudman**. After hearing the testimony of all parties concerned, how do you feel, as a taxpayer, about this whole situation?

Mr. **Weber**. As a taxpayer, I have a rather low regard for the entire Government.

Chairman **Roth**. Not the Congress, I trust.

Mr. **Weber**. I think there is far too much waste in many, many areas. This is just one of them.

Senator **Rudman**. And certainly this hearing did not go to disabuse; do you have that notion?

Mr. **Weber**. It did not.

Chairman **Roth**. Thank you.

One of our concerns is how prevalent is this kind of a practice, this failure to follow, No. 1, procurement procedures, No. 2, to try to get the best procurement for the taxpayer's dollar.

Senator **Rudman**. Mr. Chairman, I would like to thank you for convening these hearings.

I think they have been a very valuable conclusion to the hearings you initiated several weeks ago. I think specifically they give us real insight into the procurement policies we are going to be looking at over the next several years.

Chairman **Roth**. Yes, I would assure you, Senator Rudman, it is the intention of the Chair to continue these kind of hearings and I appreciate your interest and attendance.

The committee is in recess.

[Whereupon, at 1:40 p.m., the committee recessed, to reconvene at the call of the Chair.]

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

HEWLETT · PACKARD COMPANY
3000 Hanover Street, Palo Alto, California 94304

JOHN C. BECKETT
DIRECTOR OF GOVERNMENT RELATIONS
(415) 857-2260

November 20, 1981

The Honorable William V. Roth, Jr.
Chairman, Committee on Government Affairs
Dirksen Senate Office Building, Room 3306
Washington, D.C. 20510

ATTN: Lincoln C. Hoewing

SUBJECT: Defense Acquisition Process
Hearings, November 5, 1981

Dear Chairman Roth:

It is requested that this letter be made a part of the record of the hearings which were held on November 5, 1981, and concerned the Hewlett-Packard Company as a competitor for automatic calibrators being procured by the U.S. Army.

Some of the statements made about the Hewlett-Packard Company and its participation in this competition are inaccurate. We think it is important to point out the inaccuracies.

Hewlett-Packard Company did cooperate with the Army in an effort to meet their requirements. This project was undertaken to develop an automatic calibration system. We also developed and offered a commercial test system. Later we concluded there was no significant commercial market for this equipment, and we abandoned our efforts in automatic calibrators. The last contract with the Army Missile Command for this prototype automatic system was in June 1973, Contract #DAA-HO1-73-C-1146. There was some follow-on to the contract in March 1974, but this was minor. We did make offers of a completely new commercial system in 1974-75 at the request of the Army.

Hewlett-Packard is a major supplier of manual electronic calibration and test equipment and this equipment is sold worldwide. Hewlett-Packard limits its sales to the government to off-the-shelf commercial catalog items. The company avoids as a matter of policy the design and manufacture of any special equipment for a single customer. In recent years, Hewlett-Packard's total sales to all branches of the Federal government have amounted to less than 10%, including sales as a subcontractor.

It should be noted that Hewlett-Packard is a subcontractor to Ridge Instrument Company. It's our experience that Ridge Instrument Company is a competent small company well equipped to supply the Army Missile Command. Hewlett-Packard modular equipment sold to Ridge Instrument Company was entirely commercial products sold at catalog prices to the general public.

Loeb Julie testified that "starting in 1970 procurement of calibration equipment in the Services began to go less and less to the original small company calibration technology suppliers and more and more to these two large companies (Fluke and Hewlett-Packard)." This is incorrect. Hewlett-Packard was one of the original small company suppliers and has been in the forefront of the electronic instrument calibration business ever since. At the time Julie Research Laboratories was formed, 27 years ago, Hewlett-Packard was not a large company. Hewlett-Packard's growth can be attributed to a number of factors including high quality and reliable products as well as good management. Defense business has contributed to this success but to a much lesser degree.

It should be noted, too, contrary to the testimony, that Hewlett-Packard does not have any high ranking ex-military or civilian DoD procurement personnel in its organization. Mr. David Packard did serve for three years as Deputy Secretary of Defense, but he was the only Hewlett-Packard executive to serve in the Defense Department in any administration. It is fair to say that Hewlett-Packard has no more or less access to DoD than other commercial suppliers and considerably less than typical weapon systems suppliers.

To the best of our knowledge, awards by the Army did not go alternately to Hewlett-Packard and the John Fluke Company. As a practical matter, Hewlett-Packard withdrew from the competition in 1975.

Those test systems furnished in the early '70s by Hewlett-Packard have a capability far beyond calibration, and in this sense the modular equipment used to build the system was more than what was needed purely for a calibration system. It should be noted, too, that the computer technology used in these early systems has been obsolete for some time. It is not fair to compare a 1970-design system with a 1980 design as Loeb Julie has done. If Hewlett-Packard were to design a system today, it would be as compact as any system on the market. This is a direct function of the advance in semiconductors and electronic technology.

On the matter of sales to the Soviet Union, Hewlett-Packard has not sold any of these test systems to the Soviets. By law there are tight restrictions on what high-technology products can be sold to Eastern Bloc countries, and Hewlett-Packard as a matter of policy strictly follows the trade policies established by the Congress, the State Department, and the Department of Defense.

Hewlett-Packard Company is concerned about the integrity of the Federal Government Procurement System. Like the Committee, we believe the system has become too complex and therefore a deterrent to commercial suppliers who would otherwise be suppliers to the Government. The recommendations now being developed by Office of Federal Procurement Policy under P.L. 96-83 are the best hope we see for substantial improvement. We hope that any action the Committee may take as a result of the testimony on November 5, 1981, will be kept in abeyance until OFPP's recommendations reach the Committee.

Sincerely yours,

John Beckett

John C. Beckett
Director of Government Relations

JCB:lb

cc: Senators
Warren Rudman
Thomas F. Eagleton
David H. Pryor
Carl M. Levin

FLUKE

December 8, 1981

The Honorable William V. Roth, Jr.
Chairman, Committee on Governmental Affairs
Dirksen Senate Office Building, Room 3306
Washington, D.C. 20510

Dear Chairman Roth:

Subject: Defense Acquisition Process Hearings, November 5, 1981

At the Governmental Affairs committee hearing of November 5, 1981, the John Fluke Mfg. Co. and its calibration equipment were discussed. We respectfully request that this letter be made a part of the record of that hearing.

The John Fluke Mfg. Co. is a manufacturer of commercial off-the-shelf test and measurement equipment developed solely at private expense, including calibration equipment that is both manually operated and automatic. In this product category, our company is the worldwide market leader. We have supplied this equipment to a wide variety of commercial and industrial concerns in and out of the electronics industry as well as many military and civilian Government agencies. Our fiscal 1981 level of U.S. Government business for calibration equipment and all eight other Fluke product categories was 10.4% of total revenues.

Six points of obvious misstatement have been excerpted from testimony and are listed numerically herein along with our response. Many other inaccuracies exist in both the written and verbal testimony, but in the interest of brevity, we ask only that these principal points be recorded.

STATEMENT #1: ". . . from 1954 to 1960, calibration technology was developed by smaller companies like Julie Research Laboratories." ". . . starting in 1970, Government calibration procurements which used to go to small specialized calibration companies, started to go to two large companies (Hewlett-Packard Co. and John Fluke Mfg. Co.)." "Since the large companies did not make particularly high performance calibration equipment, they generally supplied large systems of lower accuracy commercial equipment."

Fluke Position: The Fluke Company was formed in 1949, five years prior to JRL. Hewlett-Packard was formed prior to WWII. At one and the same time, all three companies were small businesses competing in the calibration marketplace. All three, and many more companies, have sold calibration equipment to the Government over a long period of time. At the point in time mentioned (1970), the Fluke company was crossing the Government-defined boundary from small to large business. This happened primarily because of a continuing and heavy investment of our own dollars in new product development and after-sale product support. And, this happened only as we began to rely

John Fluke Mfg. Co., Inc. / PO Box C9090 / Everett WA 98206 / (206) 342 6300 / TWX 910 445 2943 / TLX 15 2662

less on the Government marketplace and branched into product categories needed more by the commercial marketplace. All the military services have found Fluke commercial calibration equipment to be vital in their programs since the early 1950's. In 1960, the total combined military and commercial calibration market was approximately 5 million dollars with Fluke and JRL each having roughly the same (25%) market share. JRL calibration equipment sales apparently peaked about 1963, while Fluke's stream of innovative products continued to gain market share. By 1970, the calibration market had grown to 12 million dollars, with Fluke having gained more than 50% of the market, and JRL revenues reduced to about 6% of the market. Of the more than twenty worldwide suppliers to the 1970 calibration market, some have merged, some have chosen to move into faster-growing segments of the test and measurement equipment market, some have remained small business, some have become large business, and some have gone out of business. The commercial marketplace has the remarkable ability to be self-cleaning by rewarding mainly product performance and after-sales support, thus eliminating marginal suppliers.

STATEMENT #2: "The Army has been buying manual equipment since 1961. It stopped buying manual equipment in 1974 and started buying automated equipment from Hewlett-Packard and Fluke. The failure of the automated equipment caused it to go back again and buy the same manual equipment it ordered in 1961."

Fluke Position: The Army has been continuously buying manual electrical calibration equipment since prior to WWII and continues to do so up to the present time. The mid-70's procurements of a small amount of Fluke automated calibration equipment were largely experiments to set a course for the future. For at least the past two years, the metrology arms of the services have been buying products from Fluke and others that incorporate the latest microcomputer technology for automating their calibration tasks. They have significantly upgraded their software capabilities to take advantage of new electronic technology and calibration products. Since the industry has now standardized on the "IEEE-488" bus for systems communication, they are also buying calibration equipment compatible with IEEE-488 for obvious reasons. It can reasonably be expected that these recent advances in technology will make automated calibration equipment smaller, lighter, more reliable, easier to program, easier to operate, and much less expensive. The Fluke Co. is routinely selling and delivering such advanced equipment in off the-shelf form today. It is noteworthy that the Fluke equipment included in the November 1981 Ridge contract cancellation "for convenience of the Government," was state-of-the-art AC calibration equipment that operates in an automatic IEEE-488-type system by simply adding an interface card.

STATEMENT #3: ". . . Julie was the originator of the technology, the first company to make the technology that Fluke now also makes." "Unfortunately there is a systematic defect in society's procurements of "better mousetraps." "As in . . . the cotton gin, more imitations of JRL technology have been procured than originals."

Fluke Position: Fluke has consistently produced calibration equipment that has pushed the technological state-of-the-art forward since the founding of the company. For example, Fluke introduced the Model 300 DC Calibrator in 1951 (three years prior to the establishment of JRL), representing two orders of magnitude improvement in accuracy over what was then available to the market. As another example, the first Fluke Terminal/10 automatic calibration station was delivered to a commercial customer approximately three years prior to introduction of the Locost 106.

Perhaps the best example of dedication to, and proprietary investment in, automated calibration is Fluke's first computer that was introduced in 1980. This, the Model 1720A Instrument Controller, was developed at a combined hardware/software cost to us of more than $2.5 million. It was developed primarily to be the heart of our Model 7405A Automated Calibration Station. It incorporated many technical "firsts" including an innovative touch-sensitive CRT screen for simple execution of complex calibration programs. The 1720A is now at work in more than forty Fluke 7405A Automated Calibration Stations, as well as hundreds of other customer-configured automatic test systems, including many used for calibration purposes.

As to whom produced imitations, the record shows that the Army (Redstone) let contract DAAH01-68-C-2117 to JRL in 1968 for a quantity of 122 AC/DC Measuring Systems in the amount of $230,580 after a negotiated procurement action involving both Fluke and JRL. The JRL "First Article" furnished under contract looked virtually identical to existing Fluke catalog products that met the Army's specifications. First Article testing revealed that the JRL equipment could not meet the specifications. After attempts to cure the discrepancies and after further testing over a lengthy period, the JRL contract was terminated. Fluke eventually supplied catalog equipment that met all specifications for this requirement.

STATEMENT #4: "The competition between calibration technologies is in five key areas -- programming time -- reliability -- productivity -- total cost per year -- operator training."

"Our (Locost 106) system calibrates the largest chunk of the Army's total workload."

Fluke Position: For several years, comparative data of JRL Locost 106 versus Fluke Terminal/10 has been presented at professional calibration conferences. This data may be similar in content to the Locost 106 comparative performance charts shown to the committee. Fluke has refuted comparisons we have seen simply by pointing out distortions of facts. For example, it is a fact that the Army's LACS systems (Fluke Terminal/10's) calibrate both oscilloscopes and meters. To our knowledge, installed Locost 106's calibrate only meters. The oscilloscope workload is evidently about 50% of the Army's electrical calibration workload, the same as for a typical large aerospace company. While JRL sales literature has, for several years, advertised the availability of a Locost oscilloscope calibration station, we do not know of one ever having been delivered to a customer. The LACS systems also calibrate frequency counters and signal generators. We do not believe that the Locost 106 has these capabilities. Frequency counters and signal generators are also a significant portion of the workload in most calibration laboratories.

Utilization factors in comparisons we have seen were distorted, or assumed in great favor of the Locost 106. Some of the LACS sets were actually used less than 30% of the time that they were ready for use. There is little value in comparing Locost 106 data from selected industrial settings with actual Army operating data from a large computerized automatic testing system (LACS) whose forecasted usage according to the population and type of equipments available to calibrate did not fully materialize.

As a further explanation of utilization, a joint AIA/NSIA project team that assisted the Army by reviewing their calibration program in 1977 concluded in part, ". . . the Army's experience with such equipment closely parallels that of industry in the findings that large, totally computerized automatic calibration stations are in many cases not sufficiently utilized to justify the investments. One reason for such an apparent under-utilization is the high speed of operation of computerized automatic calibration equipment. These reasons, combined with the age profile (equipment that really wasn't designed to be calibrated in an automated mode) within the Army inventory makes it highly doubtful whether such equipment as is currently in operation will ever be well utilized from a practical viewpoint."

For the record, commercial users of Terminal/10 have found from actual use over long periods that their meter calibration throughputs range from 1000 to slightly more than 3000 calibrations per year. Their more complex oscilloscope calibration throughput ranges from 500 to 1500 calibrations per year. With this level of productivity, most Terminal/10 customers have indicated that they achieved their projected returns-on-investment.

On the point of reliability, Fluke readily admits that the LACS "downtime" should have been less than 5%, but in the first year averaged 18%. Fluke service engineers responded promptly to each failure, restoring all failed systems to a fully operational status. All significant reliability problems were solved by early 1978.

Evidence that sensational comparisons of the type presented to the committee lack credibility and are usually ignored by the marketplace can be seen by comparing Locost 106 and Terminal/10 bookings. Seventy-seven Terminal/10 calibration stations have been sold, compared to the 10 or 11 Locost stations described in testimony given to the committee. To the best of our knowledge, all evaluations leading to Terminal/10 purchases included consideration of the JRL Locost 106 except for ten Terminal/10 station sales prior to the introduction of the Locost 106.

STATEMENT #5: ". . . the Fluke systems (were) eventually scrapped."

Fluke Position: The first Fluke automated calibration system (Terminal/10) bought by the Army was an experimental system installed in a mobile van. This was purchased on Dec. 17, 1974. According to our latest information, this system is presently in use at Tobyhanna Army Depot. As a further investigation of automated calibration systems, on Oct. 17, 1975 the Army bought five non-mobile Terminal/10 systems (LACS) via a procurement action where five competitive proposals were considered. Two LACS systems, namely Ft. Belvoir and Ft. Huachuca are still commissioned and in use, to the best of our knowledge. The three remaining LACS systems, including one nearly destroyed in transit to Germany, have had many of their component instruments removed for further use in newer and different manual and automatic system configurations.

STATEMENT #6: ". . . the so-called Fluke task force on Electronic Test Equipment . . . was a task force jointly sponsored by DOD and large industry."

Fluke Position: The original task force was chartered by DOD to investigate saving money by the greater military use of off-the-shelf electronic test equipment (including calibration equipment), and commercial equipment support services (including calibration services) routinely provided by the manufacturer to the commercial marketplace. Members of the formally constituted task force included officers from all the military services together with managers and presidents of small and large companies in the test and measurement equipment business. All task force meetings were advertised and open to the public, and each was attended by approximately fifty visitors representing a wide cross-section of the industry and military users. Mr. Loebe Julie of JRL was present in at least one meeting of the task force.

The final report of the task force, representing a year's work, was issued in February 1976. This report addressed some of the concerns discussed in the hearings of the Governmental Affairs committee, and may be of interest to those who are concerned that the procurement dollar is spent well.

We would suggest to the committee that there may be undue concern about lack of access by small business to high levels within DOD. The John Fluke Mfg. Co. has from its beginning used the same engineering-level contacts within both the military and commercial markets to sell its calibration equipment. Perhaps of greater concern should be the procurement set-asides for which there are no qualified suppliers, and awards made to vendors who neither have the technology or the products to meet the requirement. It may be of interest to note that the Small Business Committee of the American Electronics Association as well as their Board of Directors has taken a stand against Government intervention in the marketplace, specifically including small business set-asides. AEA is an association of more than 1,800 electronic companies, more than half of whom are small businesses employing fewer than 200 people.

In closing, it is our opinion that doing business with the Government is becoming increasingly difficult, even burdensome, for large and small companies alike who have commercial products to sell. It is also our opinion that different and fewer procurement regulations are needed. If we can be of assistance to the committee in any way in this regard, we are available at all times to help.

Sincerely,

John M. Fluke

John M. Fluke
Chairman of the Board
Chief Executive Officer

/kt

UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT, LOGISTICS,
AND READINESS DIVISION

JAN 23 1982

General Donald R. Keith
Commanding General
U.S. Army Materiel Development
& Readiness Command

Dear General Keith:

Subject: Potentially Wasteful Procurements of Army Calibration and Support Equipment (PLRD-82-37)

On April 3, 1981, we reported to Chairman, Subcommittee on Defense, Committee on Appropriations, House of Representatives, on our review of allegations of improper procurements by the U.S. Army Test Measurement and Diagnostic Equipment Support Group formerly the Army Metrology and Calibration Center (PLRD-81-16), and indicated our plan to pursue several other aspects of the Support Group's calibration activities that appeared to warrant further examination. One of those aspects involved examining the methods and procedures followed in determining and validating calibration and support equipment requirements.

FINDING

We found that the Army procured or initiated plans to obtain equipment before developing formal requirements documents, considering all available assets, and developing essential plans and workload data. As a result of prior unvalidated requirement determinations and budget cancellations, the Army has on hand or could be initiating plans to purchase a number of trucks, air conditioners and generators that may not be needed.

BACKGROUND

In our April 1981 report we recommended that the Secretary of Defense direct the Secretary of Army to: (1) develop accurate workload data on field Army calibrations because reliable data was needed to validate equipment requirements, (2) reexamine equipment capabilities to determine the extent to which automated equipment can replace manual equipment in field Army calibration units, and (3) conduct an independent hardware demonstration to establish the cost effectiveness and productivity increases that may be achieved through automating field Army calibration functions.

(942024)

In April 1981, the Secretary of the Army directed the Army's Inspector General, to conduct an investigation to determine the facts and circumstances related to the allegations and asked the Secretary of the Air Force to assist by conducting a separate and independent assessment of technical and selected policy aspects related to the same allegations.

On November 5, 1981, the Committee on Governmental Affairs, United States Senate held hearings and took sworn testimony from those persons having direct knowledge or responsibility for the events under study. The two key witnesses were Mr. Loebe Julie, President, Julie Research Laboratories (JRL) Inc., and the Honorable James R. Ambrose, Under Secretary of the Army.

In summary, the Under Secretary stated that the Army recognizes that an adequate data base and economic analysis will be needed to arrive at satisfactory decisions concerning requirements and procurement specifications for calibration equipment. He also stated that estimating precise economic gain to be realized from automating requires a site-by-site analysis because workloads vary considerably from one site to another. In specific response to the issue of how much can be saved through automation, the Under Secretary stated that the Army does not yet have an adequate data base from which to make acceptable cost savings analyses. The Under Secretary announced that the Army plans an intensive review of the total test, measurement and diagnostic equipment functions covering

--present regulations and provisions to ensure full, competent advocacy and execution of TMDE concepts, equipment acquisition, and performance monitoring;

--the most appropriate way to serve the field calibration and repair function, i.e., either fixed base or mobile units;

--how the Army can verify the operational readiness of primary equipment and systems affected by calibration and maintenance; and

--how the Army can eliminate obsolete TMDE from its inventory.

The Under Secretary indicated the results of the review and an implementation plan for any changes that may be needed is planned to be presented to him by March 15, 1982.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to examine the methods and procedures followed by the U.S. Army Test Measurement and Diagnostic Equipment (TMDE) Support Group in validating requirements for the procurement of calibration and repair sets and associated supporting equipment. We examined the concept study which was the basis for combining calibration and repair operations. We also examined procurement plans, development plans, budget documents, contracts, requisitions and related documentation directly pertinent to our objective. We also interviewed responsible management officials, procurement officials, and technical personnel having direct knowledge of the calibration and repair program. The locations providing information used in the preparation of this report are:

Office of Assistant Secretary of the Army (Materiel Development and Acquisition) Pentagon, Washington, D.C.

U.S. Army Materiel Development and Readiness Command (DARCOM) Alexandria, Virginia

The U.S. Army TMDE Support Group, Huntsville, Alabama

95th Service Company, Huntsville, Alabama

Letterkenny Army Depot, Chambersburg, Pennsylvania

Tank-Automotive Command (TACOM), Detroit, Michigan

Troop Support and Aviation Materiel Readiness Command (TSARCOM), St. Louis, Missouri

REQUIREMENTS NOT VALIDATED

The U.S. Army TMDE Support Group (formerly the Army Metrology and Calibration Center) procured and/or alerted other procuring commands to plan and budget for (i.e. ordered) equipment before developing valid requirements, considering all available assets, and developing essential plans and workload data. As a result of the above and subsequent budget cuts, the best available Support Group data information indicates that:

--19 on-hand vans, costing about $2.2 million and 9 on-order vans which could cost about $1.8 million may be excess to the Support Group's stated requirements (see appendix I);

--47 on-hand vans, costing about $5.5 million may not be needed until after fiscal year 1985 (see appendix II);

--66 air conditioning systems and 79 electric power generators, ordered at a cost of about $2.2 million are either excess to current requirements or may not be needed until after fiscal year 1985 (see appendix III); and

--41 electric power generators required to power calibration equipment during contingency situations have not been purchased (see appendix IV).

Although there are established Army management policies and procedures (i.e. required operational capability documents and basis of issue plan) for the acquisition of non-developmental equipment items, such as calibration and related support equipment, the Support Group did not follow them. As a result, the Army lacks basic data needed to make sound budgeting and requisitioning decisions on planning, directing, and controlling the calibration and repair program.

Our finding is quite similar to the conclusion of Army Under Secretary Ambrose who testified that an adequate data base and economic analysis will be needed to make satisfactory decisions on requirements and procurement specifications. The Army intends to get the data which, as of November 5, 1981, it did not have.

Concept study forms an inappropriate basis for requirements

The report entitled, "Department of the Army Concept Study for Improved Army-wide TMDE Calibration and Repair Operations" was published in March 1977 and approved in November 1978. The concept study recommended that calibration and repair operations of the field Army be consolidated under the overall management and control of DARCOM. Within DARCOM, this field Army support mission was assigned to the U.S. Army TMDE Support Group. The only exception was the Army National Guard, which kept operational control of its TMDE support capability.

Based on data derived from the March 1977 concept study, the Support Group estimated their total calibration and support equipment requirements. An August 1978 worksheet used by the Support Group to assess their equipment needs shows that these estimates included equipment for both active Army and the Army National Guard. With the addition of equipment for war reserves the concept study estimates became the total planned acquisition objective for the new consolidated mission. The concept study estimates were also the basis for procurement plan submissions and subsequent procurement actions.

The concept study, however, did not represent a requirements document or valid basis for equipment purchases. The concept study presented an implementation plan which called for a detailed assessment of equipment on a location-by-location basis after Army approval of consolidation. The sequence of events and actions set forth in the concept study's implementation plan are as follows:

1. Obtain Department of the Army approval of the concept and establish a task group to begin implementation.
2. Realign the major commands and the Support Group for managing the mission changes.

3. Activate task subgroups utilizing Support Group personnel.

4. Assess personnel and equipment requirements by location, including a determination of the availability of existing equipment and the type and quantity of equipment to be purchased.

5. Rewrite regulatory publications.

6. Prepare and submit a budget.

7. Develop training.

8. Prepare and submit organizational, personnel, and equipment plans for approval.

9. Determine optimum locations for fixed and mobile operations.

10. Initiate procurement of equipment.

11. Establish support agreements.

12. Staff Army regulations and publications.

13. Initiate assistance to managers for establishing operations.

14. Activate training.

15. Complete activation of operating units.

As shown above, the procurement of equipment was placed as the 10th step in an orderly sequence of actions and events and followed Army approval of the concept study and site-by-site analysis of equipment requirements.

Procurements initiated prematurely

The Support Group initiated procurement actions without accurate knowledge of how much to buy and where equipment would be placed.

In addition to the steps identified in the Concept Study Implementation Plan, Army Regulation 1000-1, "Policies for Systems Acquisition,' and implementing regulations provide for Army approval of a "Required Operational Capability" (ROC) document and "Basis of Issue Plan" (BOIP) before authorizing equipment purchase. A ROC document develops the need for a new capability including operational and organizational concepts and essential characteristics for using the equipment. BOIPs develop equipment requirements by organization and provide commands responsible for buying equipment, verification that the equipment to be purchased is properly authorized.

When consolidation was approved in November 1978, the Army directed DARCOM to further assess its procurement plans for calibration equipment. A December 1978 message prepared in conjunction with consolidation approval directed DARCOM, with the cooperation of other major commands, to prepare and submit for Department of Army approval reorganization plans which identified

--proposed structure of activities under the consolidated reorganization,

--calibration and repair equipment to be transferred from losing organizations, and

--procurement plans for additional equipment to include plans for using existing equipment toward calibration and repair sets.

The Support Group initiated procurement actions or submitted acquisition requests before reorganization plans, a ROC, and BOIP were finalized and approved. Support Group officials told us that procurements were initiated early in order to meet implementation milestones and that initially they believed higher-level Army offices had exempted the requirement for a ROC and BOIP. At the conclusion of our review in December 1981, the requirements and planning documents were in process and expected to be approved.

CONCLUSION

The Support Group has not efficiently and effectively managed the way it determined requirements for and purchased calibration and repair equipment. While we recognize that the Army may need additional equipment to implement the present concept of operations, the methods for determining the quantity of equipment needed and justifications used to initiate equipment purchases were premature and failed to follow established Army policies and procedures. The quantity of equipment actually needed to perform the Army's calibration and repair mission based on program implementation has yet to be defined.

This conclusion is consistent with the November 5, 1981, testimony of the Under Secretary of the Army before the Senate Committee on Governmental Affairs. In his testimony the Under Secretary stated that a comprehensive review of the entire Army calibration program would be conducted with a report by March 1982. We, therefore, conclude that further evaluation of the Army calibration program by our office, at this time, should be deferred until the ongoing comprehensive Army evaluation is concluded and the Army has been given an opportunity to take appropriate corrective actions. This report and its recommendations should be considered in that Army evaluation.

RECOMMENDATIONS

We recommend that you, on the basis of actual workload needs, take the action to:

- --Adjust orders for tactical vans, air conditioners, and generators to coincide with calibration equipment needs and existing support equipment in the inventory.
- --Assess the need for tactical vans and air conditioners in storage at Army depots.

We would appreciate receiving your reply on the actions taken in response to these recommendations.

We are providing copies of this report to the Secretary of Defense, the Secretary of the Army, and interested congressional offices.

Sincerely yours,

Robert M. Gilroy
Senior Associate Director

TACTICAL VANS EXCESS TO REQUIREMENTS

The Support Group has 19 tactical vans on hand, costing about $2.2 million, which are excess to its total estimated requirements and another 9 tactical vans costing about $1.8 million may become excess if an unfilled purchase order is filled.

Tactical vans mounted on a 5-ton truck are used by military calibration and repair teams as work shops to house calibration and repair equipment and provide a mobile working environment in both peacetime and contingency operations. The Tank-Automotive Command purchases tactical vans for the Support Group.

Worksheets provided by the Support Group show that 175 vans are currently on hand. Eighty of these vans were used in the calibration program before combining calibration and repair operations. The other 95 vans were purchased by the Tank-Automotive Command in August 1979 to fill an order placed by the Support Group in October 1978. The average cost of the vans was about $116,800 each.

In 1980 the Support Group revised the distribution and mix between basic sets, which require one van, and augmented sets, which require two vans. This revision resulted in an estimated requirement for 9 additional vans which the Support Group ordered in June 1980. According to the item manager, the 9 additional vans had been included in the current procurement planning, but would not be purchased until the Support Group's requirements are validated. The item manager estimated that these vans will cost approximately $200,000 each if purchased as planned in fiscal year 1984.

In July 1981, the Support Group again revised its estimates for tactical vans to the current requirement of 156. According to Support Group officials, the reductions resulted, in part, from determinations that calibration equipment would be removed from existing tactical vans and assigned to locations in the United States which did not have a tactical mission, and that existing workload and personnel resources in Europe did not justify the deployment of equipment as planned.

TACTICAL VANS PURCHASED BUT NOT NEEDED

UNTIL AFTER FISCAL YEAR 1985

The Support Group will not need 47 on-hand tactical vans costing about $5.5 million, until after fiscal year 1985 because funds for the calibration and repair equipment to be installed in those vans has not been provided.

When the 95 tactical vans, discussed in Appendix I, were ordered in October 1978, Support Group officials anticipated that funds would become available for calibration equipment to be installed in the vans. However, as a result of budget cuts, funding for calibration equipment to be installed on 40 tactical vans for the Army National Guard; 4 vans for war reserves; and 3 vans for active components has been deferred until fiscal year 1985.

The 40 tactical vans, which were purchased for the Army National Guard, are currently stored in humidity controlled warehouses at the Letterkenny Army Depot in Chambersburg, Pennsylvania. Before the vans were purchased, the Support Group confirmed with the Guard that 40 tactical vans were required for 20 calibration teams. The need for the Guard vans, however, will not materialize until the National Guard Bureau establishes organizations and locations for tactical calibration and repair operations to support mobilization requirements. According to the DARCOM liaison for the National Guard, the vans will not be requisitioned from storage until the organizations are officially established.

Army position on National Guard equipment

At a January 26, 1982, meeting, Army officials told us that the National Guard TMDE Support Company is planned for activation in fiscal year 1982. They expressed the view that the delay in funding calibration sets until fiscal year 1985-86 does not alter the requirement for the 40 vans, 40 air conditioners and 20 generators for the National Guard. According to Army officials, the current plan is to take the calibration equipment at the various state maintenance shops of the Guard and place it in the new vans. This, according to the Army officials, will give them mobile capability to partially meet mobilization requirements. However, these vans will need consoles and racks to accommodate the calibration equipment. This is, in our view, further evidence of inadequate planning.

AIR CONDITIONERS AND GENERATORS

EXCESS TO REQUIREMENTS

On the basis of Support Group planning data, 66 air conditioning systems and 79 generators, ordered at a potential cost of about $2.2 million, are either excess to requirements or may not be needed until after fiscal year 1985.

One air conditioner and generator is assigned to each tactical van. Air conditioners, which cost about $5,100 each, are mounted on tactical vans to cool the working area. Generators, costing about $23,900 each, provide electricity for calibration equipment when commercial power is unavailable. The Troop Support and Aviation Materiel Readiness Command purchases both air conditioners and generators for the Support Group.

As in the case of tactical vans, the Support Group currently estimates a total requirement for 156 air conditioners and generators, of which only 109 will be needed through fiscal year 1985. Support Group records indicate the following on hand and on order status of air conditioners and generators in comparison to its estimated requirements.

	Air conditioners	Generators
On hand	106	68
On order	69	120
Total on hand and on order	175	188
Total Requirement	156	156
Excess to total requirement	19	32
Quantity not needed until after fiscal year 1985	47	47
Total excess to current needs	66	79
Estimated cost per unit	$ 5,100	$ 23,900
Potential cost of equipment excess to current needs	$336,600	$1,888,100

At the time of our review, the Support Group had not revised the orders for either air conditioners and generators and, according to the commodity item managers, the equipment had not been provided to the Support Group.

GENERATORS ON ORDER BUT NOT PURCHASED

Of the 120 generators which the Support Group has ordered, 41 are currently required to power on-hand mobile calibration sets during contingency situations when commercial electricity is unavailable. The Support Group has been unable to obtain the needed generators because established Army management policies and procedures (i.e., required operational capability (ROC) and basis of issue plan (BOIP)) for the acquisition of calibration and related support equipment has not been followed.

After the Support Group ordered 75 generators in October 1978, the item manager informed the Group that the order would not be filled because a requirement for the generators was not in the Structures and Composition file. Requirements cannot be established in that file until there is an approved BOIP. The BOIP cannot be approved until the ROC is approved, and neither the ROC nor the BOIP have been approved.

Although the order for 75 generators was rejected, the Support Group resubmitted another order, increasing the quantity to 120. The item manager again refused to fill the order for the same reason stated above, but informed the Group that delivery would begin in March 1984 if requirements were established in the structures and composition file by January 1982.